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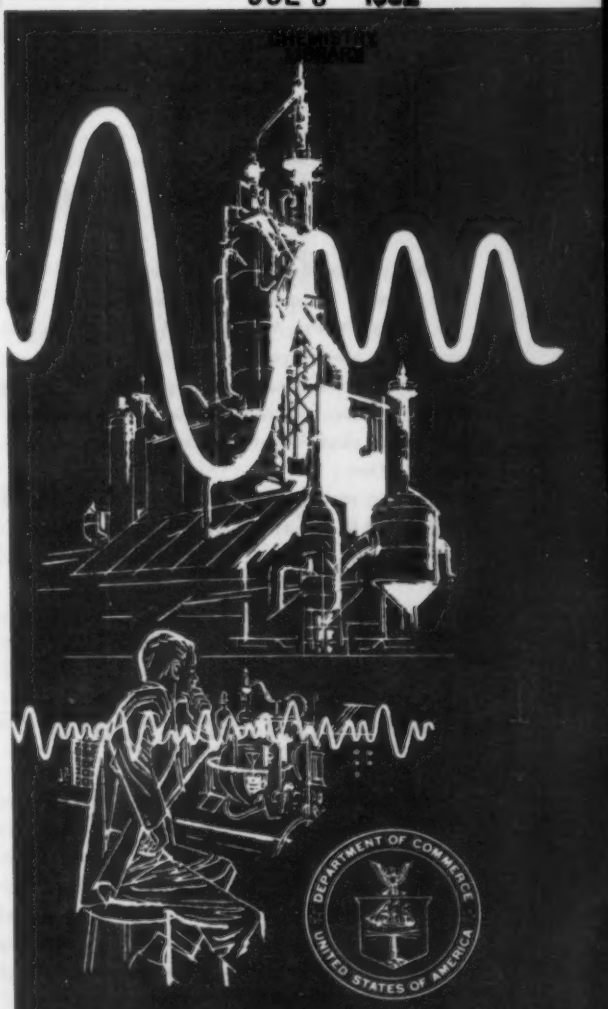

U. S. DEPARTMENT OF COMMERCE
BUSINESS AND DEFENSE SERVICES ADMINISTRATION
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U.S. GOVERNMENT RESEARCH REPORTS

U.S. DEPARTMENT OF COMMERCE
Luther H. Hodges, *Secretary*

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AD-273 200 62-2-5 DIV. 9
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***AERODYNAMIC HEATING**

AD-273 102 62-2-5 DIV. 25
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(*AERODYNAMIC HEATING; SHOCK WAVES; GASES; *NITROGEN; INFRARED SPECTROSCOPY; *ELECTRON TRANSITIONS; THEORY; QUANTUM MECHANICS.) (HIGH TEMPERATURE RESEARCH; AIR; SPECTROGRAPHIC ANALYSIS; REENTRY AERODYNAMICS.)

AD-273 103 62-2-5 DIV. 9
CORNELL AERONAUTICAL LAB., INC., BUFFALO, N. Y.
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AD-273 255 62-2-5 DIV. 12
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AD-273 037 62-2-5 DIV. 9
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AD-273 133 62-2-5 DIV. 19
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AD-273 144 62-2-5 DIV. 1
NATIONAL AVIATION FACILITIES EXPERIMENTAL CENTER, ATLANTIC CITY, N. J.
DESCRIPTORS: *AIRPLANE LANDINGS; *VOICE COMMUNICATION SYSTEMS; *AIR TRAFFIC CONTROL SYSTEMS; *AUTOMATIC NAVIGATORS; *FLIGHT SIMULATORS; HEIGHT FINDING; DIRECTION FINDING; DETECTION; DISPLAY SYSTEMS; GLIDE PATH SYSTEMS, APPROACH LIGHTS; RUNWAYS; GROUND SPEED INDICATORS; RADIO COMMUNICATION SYSTEMS; PARAMETRIC AMPLIFIERS; *DATA PROCESSING SYSTEMS; DISPLAY SYSTEMS; RADAR EQUIPMENT; DOPPLER SYSTEMS; ANTENNAS; DIRECTION FINDING; *SAFETY; SIMULATION; THEORY; GROUND CONTROLLED RADAR.

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AD-273 061 62-2-5 DIV. 33
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AD-273 144 62-2-5 DIV. 1
NATIONAL AVIATION FACILITIES EXPERIMENTAL CENTER, ATLANTIC CITY, N. J.
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(METALLIC CRYSTALS; *METALS; MAGNESIUM; CADMIUM; ZINC.) (SINGLE CRYSTALS; *ALLOYS; TIN ALLOYS; SILVER ALLOYS; MAGNESIUM ALLOYS.) (MAGNETIC SUSCEPTIBILITY; HALL EFFECT; ELECTROMAGNETIC PROPERTIES; RESISTANCE.) LOW TEMPERATURE RESEARCH; CRYSTAL STRUCTURE; LATTICES; SURFACES; MAGNETIC FIELDS; ELECTRIC CURRENTS; CYCLOTRONS; SOLID STATE PHYSICS.

AD-273 065 62-2-5 DIV. 14
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AD-273 287 62-2-5 DIV. 17
ARMOUR RESEARCH FOUNDATION. CHICAGO. ILL.
(BRITTLE MATERIALS. *BERYLLIUM ALLOYS. *ALUMINUM ALLOYS. *SILVER ALLOYS. GERMANIUM ALLOYS. PREPARATION. SINTERING.) (POWDER ALLOYS. POWDER METALS. POWDER METALLURGY. JOINING. BINDERS. PROCESSING.) (HEAT TREATMENT. MECHANICAL PROPERTIES.)

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(SYNTHESIS OF *CATALYSTS. METAL-ORGANIC COMPOUNDS AND SALTS OF *ALUMINUM COMPOUNDS AND *ETHYL RADICALS. *TITANIUM COMPOUNDS AND *HALIDES. *COMPLEX COMPOUNDS.) (CATALYSIS. POLYMERIZATION. STEREOCHEMISTRY. MOLECULAR ISOMERISM.)

AD-273 263 62-2-5 DIV. 10
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(*ALUMINUM COMPOUNDS. *OXYFLUORIDES. *OXIDES. FLUORIDES. HEAT OF FORMATION. CHEMICAL REACTIONS. *THERMOCHEMISTRY.) (BORON COMPOUNDS. BORIC ACIDS. CHEMICAL REACTIONS. OXIDES. WATER.) (SOLID ROCKET PROPELLANTS. ALUMINUM COMPOUNDS. THERMODYNAMICS.)

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AD-273 049 62-2-5 DIV. 7
LOCKHEED AIRCRAFT CORP.. SUNNYVALE. CALIF.
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AD-273 225 62-2-5 DIV. 30
MRO-SINGER. INC.. STATE COLLEGE. PA.
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AD-273 049 62-2-5 DIV. 7
LOCKHEED AIRCRAFT CORP.. SUNNYVALE. CALIF.
(*FUEL CELLS. *WET CELLS. *ELECTROLYTIC CELLS. ELECTRODES. *ANODES (ELECTROLYTIC CELL). *CATHODES (ELECTROLYTIC CELL). CATALYSTS. PLATINUM. *FUELS. *AMMONIA. ETHYLENES. *GLYCOLS. *UREA. ELECTROLYTES. POTASSIUM COMPOUNDS. HYDROXIDES. CARBONATES.)

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***ASTRONOMICAL OBSERVATORIES**

AD-273 143 62-2-5 DIV. 2
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(*ASTRONOMICAL OBSERVATORIES STRATOSPHERE BY HIGH ALTITUDE BALLOONS. INSTRUMENTATION.) (PHYSICAL PROPERTIES OF *PLANETARY ATMOSPHERES. DETERMINATION. RECORDING DEVICES EXPERIMENTAL DATA.)

***ATMOSPHERIC ELECTRICITY**

AD-273 307 62-2-5 DIV. 2
LITTLE. ARTHUR D.. INC.. CAMBRIDGE. MASS.
(*ATMOSPHERIC ELECTRICITY. INSTRUMENTATION. *WEATHER FORECASTING. LIGHTNING. FOG.) (INSTRUMENTATION. LIGHTNING DETECTORS.) (FOG. ELECTRICAL PROPERTIES. CONDUCTIVITY.)

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COLOGNE U. (GERMANY).
(*OZONE. DISTRIBUTION. MEASUREMENT. *ATMOSPHERIC SOUNDING. BALLOONS.) (EXPERIMENTAL DATA. DATA PROCESSING SYSTEMS.)

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AD-273 078 62-2-5 DIV. 2
MAX-PLANCK-INSTITUT FUR AERONOMIE (GERMANY).
(HIGH ALTITUDE. ATMOSPHERE. IONIZATION. *COSMIC RAYS. *AURORAE. *X RAYS. MEASUREMENT. AIRBORNE. INSTRUMENTATION. ELECTRONIC EQUIPMENT. *RADIATION COUNTERS. BALLOONS.) (PULSE COUNTERS. RADIO TRANSMITTERS. POWER SUPPLIES. OSCILLATORS. ELECTRIC FILTERS. RADIO RECEIVERS. ELECTRONIC CIRCUITS. PACKAGING.)

AD-273 079 62-2-5 DIV. 2
MAX-PLANCK-INSTITUT FUR AERONOMIE (GERMANY).
(*X RAYS. *COSMIC RAY BURSTS. INTENSITY. *AURORAE. MAGNETIC EFFECTS. MEASUREMENT.) (BALLOONS. AIRBORNE. GEIGER COUNTERS. IONIZATION CHAMBERS.)

***AUSTENITE**

AD-273 221 62-2-5 DIV. 17
GENERAL DYNAMICS/ASTRONAUTICS. SAN DIEGO. CALIF.
(*STAINLESS STEEL (300 SERIES). *PHASE TRANSITIONS. *AUSTENITE. DECOMPOSITION. MARTENSITE. MEASUREMENT. CRYOGENICS. TEMPERATURE. DEFORMATION. MECHANICAL PROPERTIES. MAGNETIC PROPERTIES.) (TEST METHODS. TEST EQUIPMENT. FERROMAGNETISM.) LOW TEMPERATURE RESEARCH. SOLID STATE PHYSICS. ALLOYS.

***AUTOMATIC NAVIGATORS**

AD-273 184 62-2-5 DIV. 1
NATIONAL AVIATION FACILITIES EXPERIMENTAL CENTER. ATLANTIC CITY. N. J.
DESCRIPTORS: *AIRPLANE LANDINGS. *VOICE COMMUNICATION SYSTEMS. *AIR TRAFFIC CONTROL SYSTEMS. *AUTOMATIC NAVIGATORS. *FLIGHT SIMULATORS. HEIGHT FINDING. DIRECTION FINDING. DETECTION. DISPLAY SYSTEMS. GLIDE PATH SYSTEMS. APPROACH LIGHTS. RUNWAYS. GROUND SPEED INDICATORS. RADIO COMMUNICATION SYSTEMS. PARAMETRIC AMPLIFIERS. *DATA PROCESSING SYSTEMS. DISPLAY SYSTEMS. RADAR EQUIPMENT. DOPPLER SYSTEMS. ANTENNAS. DIRECTION FINDING. *SAFETY. SIMULATION. THEORY. GROUND CONTROLLED RADAR.

***AUTOMATION**

AD-273 900 62-2-5 DIV. 30
GRUMMAN AIRCRAFT ENGINEERING CORP.. BETHPAGE. N. Y.
(ABSTRACT) *THEORY OF EFFECTIVENESS OF (COMPUTABLE) *FUNCTIONS.) (*AUTOMATION. *STATISTICAL ANALYSIS (DECISION THEORY). *MATHEMATICAL LOGIC. *METAMATHEMATICS. MATRIX ALGEBRA. ANALYSIS (RECURSIVE). (RECURSIVE FUNCTIONS) COMPUTERS.)

***AVIATION PERSONNEL**

AD-273 969 62-2-5 DIV. 23
DUNLAP AND ASSOCIATES. INC.. STAMFORD. CONN.
(*TRAINING. EFFECTIVENESS OF *AVIATION PERSONNEL FOR SPACE FLIGHT. SIMULATION.) *SELECTION. STRESS (PSYCHOLOGY).

***BACKWARD-WAVE OSCILLATORS**

AD-273 181 62-2-5 DIV. 25
CENTRE DE PHYSIQUE ELECTRONIQUE ET CORPUSCULAIRE (FRANCE).
(*INFRARED RADIATION. *ELECTRON BEAMS FROM ELECTRON GUNS. TESTS.) (FEASIBILITY STUDIES. *BACKWARD-WAVE OSCILLATORS. *WAVEFORM GENERATORS. DESIGN.) PHOTOGRAPHIC ANALYSIS.

***BALL MILLS**

AD-273 090 62-2-5 DIV. 17
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. WASHINGTON. D. C.
(PRODUCTION. *POWDER METALS. ABRASIVES. LIQUIDS. *BALL MILLS.) (COPPER. IRON. CHROMIUM. NICKEL. SILVER.) (WATER. CYCLOHEXANES. HEPTANES. CHLORIDES. METHANES ETHANOLS.) INORGANIC SUBSTANCES. SALTS. REAGENTS. PIGMENTS. COATINGS. SOLDERING ALLOY. PROPELLANTS. POWDER METALLURGY. DISPERSION HARDENING. METALS.

***BARIUM COMPOUNDS**

AD-273 424 62-2-5 DIV. 8
CORNELL-DUBILIER ELECTRIC CORP.. NEW BEDFORD. MASS.
(*CAPACITORS. *CERAMIC CAPACITORS. MATERIALS. *DIELECTRICS. *BARIUM COMPOUNDS. CALCIUM COMPOUNDS. *TITANATES. FLUORINATION. HIGH TEMPERATURE RESEARCH. ENCAPSULATION. MANUFACTURING METHODS. INDUSTRIAL PRODUCTION. DIELECTRIC PROPERTIES.)

***BEACHES**

AD-273 258 62-2-5 DIV. 2
NAVAL ORDNANCE TEST STATION. CHINA LAKE. CALIF.
(*OCEANOGRAPHY AND OCEAN BOTTOM. ANALYSIS OF *BEACHES ALONG SOUTH CHINA SEA. EGYPT. TAIWAN. KOREA. IRAN. ARABIA. FINLAND AND USSR.) (*GEOGRAPHY. HISTORY. GEOLOGY AND METEOROLOGY.) (METEOROLOGICAL DATA. *OCEANOGRAPHICAL DATA AND *SEDIMENTATION.) ANTISUBMARINE WARFARE.

***BEHAVIOR**

AD-273 097 62-2-5 DIV. 28
ARIZONA STATE U.. TEMPE.
(*BEHAVIOR. MAN. EFFECTIVENESS. JOB ANALYSIS. MATHEMATICAL ANALYSIS. *MATHEMATICAL COMPUTER DATA.) (PSYCHOLOGY. THEORY.)

***BENZENES**

AD-273 125 62-2-5 DIV. 4
DOVER. N. J.
ZENES AND *NITROBENZENES BY NITRO-
FELTMAN RESEARCH LABS.. PICATINNY ARSENAL.
(CHEMICAL REACTIONS. PHOTOCHEMISTRY. *PHOTOCHEMICAL REACTIONS. *NITROGEN COMPOUNDS AND DIOXIDES. LIGHT. ULTRAVIOLET RADIATION.) ULTRAVIOLET SPECTROSCOPY. USSR.

***BERYLLIUM**

AD-273 169 62-2-5 DIV. 20
GENERAL DYNAMICS/ASTRONAUTICS. SAN DIEGO. CALIF.
(*NEUTRON BOMBARDMENT OF *BERYLLIUM. REFLECTORS. HELIUM.) (BERYLLIUM. MECHANICAL PROPERTIES. TEMPERATURE. TENSILE PROPERTIES. ELASTICITY. DENSITY. THERMODYNAMICS. MELTING. BOILING. HEAT OF FUSION. SPECIFIC HEAT. THERMAL CONDUCTIVITY. THERMAL EXPANSION.) (NEUTRON FLUX DENSITY. MASS NUMBER.) (RE-ENTRY AERODYNAMICS. RADIATION EFFECTS. REACTOR REFLECTOR MATERIALS. BERYLLIUM. HAZARDS.)

***BERYLLIUM ALLOYS**

AD-273 287 62-2-5 DIV. 17
ARMOUR RESEARCH FOUNDATION. CHICAGO. ILL.
(BRITTLE MATERIALS. *BERYLLIUM

ALLOYS. *ALUMINUM ALLOYS. *SILVER ALLOYS. GERMANIUM ALLOYS. PREPARATION. SINTERING.) (POWDER ALLOYS. POWDER METALS. POWDER METALLURGY. SUPPLIES. BINDERS. PROCESSING.) (HEAT TREATMENT. MECHANICAL PROPERTIES.)

*BIBLIOGRAPHY

AD-273 073 62-2-5 DIV. 27
LOCKHEED AIRCRAFT CORP., SUNNYVALE, CALIF.
(*ROCKET MOTORS. *ROCKET MOTOR NOZZLES. *PRESSURE VESSELS. PLASTICS. MATERIALS. FILAMENT WOUND CONSTRUCTION. JATOS.) *BIBLIOGRAPHY.

AD-273 074 62-2-5 DIV. 6
LOCKHEED AIRCRAFT CORP., SUNNYVALE, CALIF.
(*RADAR, RADAR RANGES. *RADAR TRACKING. RADAR DECEPTION. COUNTERMEASURES. DOPPLER RADAR. *SEARCH RADAR. *RADAR SIGNAL. *RADAR PULSES.) *BIBLIOGRAPHY.

AD-273 081 62-2-5 DIV. 14
MONSANTO RESEARCH CORP., EVERETT, MASS.
*BIBLIOGRAPHY. *HYDRAULIC FLUIDS. LUBRICANTS. *ADDITIVES. HIGH TEMPERATURE RESEARCH.

AD-273 135 62-2-5 DIV. 14
LOCKHEED AIRCRAFT CORP., SUNNYVALE, CALIF.
(*BIBLIOGRAPHY. RADIATION EFFECTS.) *RADIATION DAMAGE. POLYMERS. FLUORIDES. ETHYLENES. PLASTICS. *FLUOROCARBONS.

AD-273 136 62-2-5 DIV. 12
LOCKHEED AIRCRAFT CORP., SUNNYVALE, CALIF.
(*BIBLIOGRAPHY. *MOON.) (LUNAR PROBES. MANNED SPACESHIPS. CLOSED-CYCLE ECOLOGICAL SYSTEMS. TRANSPORTATION. EXTRATERRESTRIAL BASES. PLANETS. ARCTIC REGIONS. EXPLORATION. GEOLOGY. LOGISTICS. FROSTBITE. SATELLITE VEHICLES. SPACE CAPSULES. PERMAFROST.)

AD-273 166 62-2-5 DIV. 18
ARMY ARTILLERY AND MISSILE SCHOOL, FORT SILL, OKLA.
(*BIBLIOGRAPHY. GUERRILLA WARFARE.) (MILITARY OPERATIONS. PROPAGANDA. WARFARE.)

AD-273 184 62-2-5 DIV. 17
DEFENSE METALS INFORMATION CENTER, COLUMBUS, OHIO.
(*BIBLIOGRAPHY. *HEAT RESISTANT ALLOYS. *METALS. *CERAMIC MATERIALS. *REFRACTORY MATERIALS. ALLOYS.) (STAINLESS STEEL STEEL. IRON ALLOYS. NICKEL ALLOYS. BERYLLIUM TITANIUM. MAGNESIUM. NIOBIUM. CHROMIUM. MOLYBDENUM. TANTALUM. VANADIUM. TUNGSTEN.) COATINGS.

AD-273 195 62-2-5 DIV. 12
AEROSPACE CORP., LOS ANGELES, CALIF.
(*BIBLIOGRAPHY. *GUIDED MISSILES. GUIDED MISSILE RESEARCH, POWER SUPPLIES, PROPULSION, ELECTRONICS, RADIATION DAMAGE, ENERGY.) (MAINTENANCE, MANNED.)

*BLACKBODY RADIATION

AD-273 032 62-2-5 DIV. 25
VITRO LABS., WEST ORANGE, N. J.
(*SOLAR SPECTRUM. SIMULATION. PLASMA PHYSICS. *ELECTRIC ARCS.) (ELECTRIC ARCS. GASES. ARGON.) *BLACKBODY RADIATION.

*BLAST

AD-273 205 62-2-5 DIV. 9
BALLISTIC RESEARCH LABS., ABERDEEN PROVING GROUND, MD.
(*SHOCK WAVES. *BLAST. SPHERES. *TURBULENT FLOW. SPACE CHARGES.) (HYDRODYNAMICS. EQUATIONS. PARTICLES. VELOCITY.) (PIEZOELECTRIC GAGES. MEASUREMENT.) (*NUMERICAL ANALYSIS. *INTEGRATION. PARTIAL DIFFERENTIAL EQUATIONS.) DIGITAL COMPUTERS.

*BOILING WATER REACTORS

AD-273 412 62-2-5 DIV. 20
FOREIGN TECH. DIV., AIR FORCE SYSTEMS COMMAND, WRIGHT-PATTERSON AIR FORCE BASE, OHIO.
(*POWER REACTORS. *SPHERES. PARTICLES. VELOCITY. DIFFUSION. SCATTERING. REFLECTION.) (HETEROGENEOUS REACTORS. *BOILING WATER REACTORS. *NUCLEAR POWER PLANTS. *KINETIC THEORY.) (GRAPHITE. BERYLLIUM. PLUTONIUM COMPOUNDS. STATISTICAL DISTRIBUTIONS. STATISTICAL FUNCTIONS. POLYNOMIALS. FUNCTIONS. INTEGRAL EQUATIONS. NUMERICAL METHODS AND PROCEDURES. TABLES.)

*BOOSTER ROCKETS

AD-273 334 62-2-5 DIV. 12
NORTHROP CORP., HAWTHORNE, CALIF.
(*SATELLITE VEHICLES. *GUIDED MISSILES. *BOOSTER ROCKETS. DYNAMICS. *VIBRATION. FATIGUE (MECHANICS). AIRFRAMES. STRUCTURES.) (VIBRATION FROM ROCKET MOTOR NOISE. EXHAUST GASES. TURBULENT BOUNDARY LAYER. OSCILLATION OF SHOCK WAVES. FLUTTER. TURBULENCE ATMOSPHERE. WIND. METEORITES. COMBUSTION OF ROCKET MOTORS.) (VIBRATION. FATIGUE (MECHANICS). MATHEMATICAL ANALYSIS. INTEGRAL EQUATIONS. ANALYSIS. TEST METHODS. EXPERIMENTAL DATA.) AERODYNAMICS. GROUND EFFECT.

*BORON COMPOUNDS

AD-273 266 62-2-5 DIV. 4
RIAS, INC., BALTIMORE, MD.
(*BORON COMPOUNDS. HYDRIDES. *ORGANOBORANES. *COMPLEX COMPOUNDS. PYRIDINES. *ELECTRON TRANSITIONS. ATOMIC ENERGY LEVELS. QUANTUM MECHANICS.) METALORGANIC COMPOUNDS.

*BREMSSTRAHLUNG

AD-273 059 62-2-5 DIV. 25
ORDNANCE TANK-AUTOMOTIVE COMMAND, DETROIT, MICH.
(X RAYS. *RADIOGRAPHIC ANALYSIS. *BREMSSTRAHLUNG. *X-RAY SPECTRUM. ELECTROSTATICS.) (ELECTRONS. SCATTERING AND PHOTONS. ABSORPTION. ENERGY.) (VOLTAGE. BETATRONS. CYCLOTRON TARGETS.) (COMPUTERS. CODING.)

AD-273 415 62-2-5 DIV. 8
ELECTRICAL ENGINEERING RESEARCH LAB., U. OF ILLINOIS, URBANA.
(*RADIOFREQUENCY GENERATORS. *MICROWAVES. *ELECTROMAGNETIC WAVES. MICROWAVE FREQUENCY. WAVE TRANSMISSION.) (ELECTRON BEAMS. *FREQUENCY MULTIPLIERS. FREQUENCY SHIFT. *CERENKOV RADIATION. *BREMSSTRAHLUNG.) ELECTRONS. PLASMA PHYSICS. DIELECTRICS. *WAVEGUIDES.

*BRILLOUIN ZONES

AD-273 017 62-2-5 DIV. 17
CASE INST. OF TECH., CLEVELAND, OHIO.
(METALS. *ZINC. CRYSTALS. SINGLE CRYSTALS. BRILLOUIN ZONES. *MAGNETIC SUSCEPTIBILITY. MAGNETIC FIELDS. QUANTUM MECHANICS. ATOMIC ENERGY LEVELS. THEORY.) SOLID STATE PHYSICS.

*BRITTLE MATERIALS

AD-273 047 62-2-5 DIV. 14
FELTMAN RESEARCH LABS., PICATINNY ARSENAL, DOVER, N. J.
(*GLASS. PROCESSING. TENSILE PROPERTIES. *BRITTLE MATERIALS. SURFACE PROPERTIES.) (PICKLING. HEAT TREATMENT. PRESSURE. COOLING. DEGASIFICATION. RADIATION EFFECTS. GAMMA RAYS. ULTRASONICS. SOUND.) USSR.

AD-273 222 62-2-5 DIV. 14
GENERAL DYNAMICS/ASTRONAUTICS, SAN DIEGO, CALF.
(*CERAMIC MATERIALS. *BRITTLE MATERIALS. SOLIDS. SINGLE CRYSTALS. *DEFORMATION. *PLASTICITY. MECHANICAL PROPERTIES. PHYSICAL PROPERTIES.) (TEST METHODS. TEST EQUIPMENT.) (*SODIUM COMPOUNDS. CHLORIDES. *MAGNESIUM COMPOUNDS. OXIDES. DATA.) SOLID STATE PHYSICS.

*BUCKLING

AD-273 070 62-2-5 DIV. 25
ISRAEL INST. OF TECH., HAIFA.
(*CONICAL BODIES. *BUCKLING. TEMPERATURE. PRESSURE. *THERMAL STRESSES.) (*TAYLOR'S SERIES. DIFFERENTIAL EQUATIONS. POLYNOMIALS. INTEGRAL EQUATIONS. MATRIX ALGEBRA.)

*BUOYANT MATERIALS

AD-273 071 62-2-5 DIV. 1
KAYSAM CORP. OF AMERICA, PATERSON, N. J.
(*BALLOONS. *METEOROLOGICAL BALLOONS. MATERIALS. *BUOYANT MATERIALS. FILMS. CONFIGURATION. AERODYNAMIC CONFIGURATIONS. RADIATION EFFECTS.) (POLYMERS. SYNTETIC RUBBER. PLASTICIZERS. CATALYSTS. REINFORCING MATERIALS.) (TESTS. PHYSICAL PROPERTIES. MECHANICAL PROPERTIES. TENSILE PROPERTIES. ELASTICITY. ULTRAVIOLET RADIATION. OZONE.) (FLIGHT TESTING. HIGH ALTITUDE.)

*CAPACITANCE BRIDGES

AD-273 066 62-2-5 DIV. 25
ADVANCED ELECTRONICS CENTER, GENERAL ELECTRIC CO., ITHACA, N. Y.
(*WAVEGUIDES. *SEMICONDUCTORS. PHOTOELECTRIC SHUTTERS. *DIELECTRIC PROPERTIES.) (ANTENNAS. METALLIC CRYSTALS. DIODES.) (MICROWAVES. *CAPACITANCE BRIDGES.)

*CAPACITORS

AD-273 170 62-2-5 DIV. 8
GENERAL ELECTRIC CO., OWENSBORO, KY.
(*ELECTRONIC CIRCUITS. HIGH TEMPERATURE RESEARCH. THERMIONIC EMISSION. RADIATION DAMAGE.) (CIRCUITS. *ELECTRON TUBES. *DIODES. TRIODES. ELECTRICAL PROPERTIES. MECHANICAL PROPERTIES. PROCESSING. MATERIALS. SHOCK RESISTANCE. LIFE EXPECTANCY. TITANIUM.) (*RESISTORS. *CARBON RESISTORS. MATERIALS. TUNGSTEN. MOLYBDENUM. LIFE EXPECTANCY.) (*CAPACITORS. MATERIALS. DIELECTRICS. CERAMIC MATERIALS. *VARIABLE CAPACITORS. *MICA CAPACITORS.) TEST EQUIPMENT.

AD-273 277 62-2-5 DIV. 22
DAVIDSON LAB., STEVENS INST. OF TECH., HOBOKEN, N. J.
(*EXPLOSIVES. CESIUM COMPOUNDS. ADDITIVES. *EXPLOSIONS. ELECTRICAL CONDUCTANCE. RESISTANCE. ELECTRICAL PROPERTIES. MEASUREMENT.) (*SHAPED CHARGES. PENETRATION. COPPER. TARGETS. SPECTROGRAPHIC ANALYSIS. PHOTOGRAPHIC ANALYSIS.) (*CAPACITORS. DESIGN. TESTS.)

AD-273 424 62-2-5 DIV. 8
CORNELL-DUBILIER ELECTRIC CORP., NEW BEDFORD, MASS.
(*CAPACITORS. *CERAMIC CAPACITORS. MATERIALS. *DIELECTRICS. *BARIUM COMPOUNDS. CALCIUM COMPOUNDS. *TITANATES. FLUORINATION. HIGH TEMPERATURE RESEARCH. ENCAPSULATION. MANUFACTURING METHODS. INDUSTRIAL PRODUCTION. DIELECTRIC PROPERTIES.)

*CARBON RESISTORS

AD-273 170 62-2-5 DIV. 8
GENERAL ELECTRIC CO., OWENSBORO, KY.
(*ELECTRONIC CIRCUITS. HIGH TEMPERATURE RESEARCH. THERMIONIC EMISSION. RADIATION DAMAGE.) (CIRCUITS. *ELECTRON TUBES. *DIODES. TRIODES. ELECTRICAL PROPERTIES. MECHANICAL PROPERTIES. PROCESSING. MATERIALS. SHOCK RESISTANCE. LIFE EXPECTANCY. TITANIUM.) (*RESISTORS. *CARBON RESISTORS. MATERIALS. TUNGSTEN. MOLYBDENUM. LIFE EXPECTANCY.) (*CAPACITORS. MATERIALS. DIELECTRICS. CERAMIC MATERIALS. *VARIABLE CAPACITORS. *MICA CAPACITORS.) TEST EQUIPMENT.

*CARGO

AD-273 061 62-2-5 DIV. 33
BOEING CO., RENTON, WASH.
(*AIR TRANSPORTATION. *CARGO. DATA. STATISTICAL ANALYSIS.)

*CASTING

AD-273 409 62-2-5 DIV. 26
FOREIGN TECH. DIV., AIR FORCE SYSTEMS COMMAND, WRIGHT-PATTERSON AIR FORCE BASE, OHIO.
(INDUSTRIAL PRODUCTION. MANUFACTURING METHODS. METALS. CRYSTALLIZATION. *CASTING.) USSR.

*CATALYSTS

AD-273 126 62-2-5 DIV. 4
FELTMAN RESEARCH LABS., PICATINNY ARSENAL, DOVER, N. J.
(SYNTHESIS OF *CATALYSTS. METAL-ORGANIC COMPOUNDS AND SALTS OF *ALUMINUM COMPOUNDS AND *ETHYL RADICALS. *TITANIUM COMPOUNDS AND *HALIDES. *COMPLEX COMPOUNDS.) (CATALYSIS. POLYMERIZATION. STEREOCHEMISTRY. MOLECULAR ISOMERISM.)

*CATHODES (ELECTROLYTIC CELL)

AD-273 069 62-2-5 DIV. 7
LOCKHEED AIRCRAFT CORP., SUNNYVALE, CALIF.
(*FUEL CELLS. *WET CELLS. *ELECTROLYTIC CELLS. ELECTRODES. *ANODES (ELECTROLYTIC CELLS). *CATHODES (ELECTROLYTIC CELL). CATALYSTS. PLATINUM. *FUELS. *AMMONIA. ETHYLENES. GLYCOLS. *UREA. ELECTROLYTES. POTASSIUM COMPOUNDS. HYDROXIDES. CARBONATES.)

*CATHODES (ELECTRON TUBES)

AD-273 481 62-2-5 DIV. 4
SPERRY GYROSCOPE CO., GREAT NECK, N. Y.
(*OXIDE CATHODES. *CATHODES (ELECTRON TUBES). BARIUM COMPOUNDS. OXIDES. RARE EARTHS. IONS. STRONTIUM COMPOUNDS. IMPURITIES. *THERMIONIC EMISSION. *WORK FUNCTION. TEMPERATURE. FLUORESCENCE. MEASUREMENT.) (DIODES. ELECTRON TUBES. PHOTOEMISSION. TEST EQUIPMENT. DESIGN.)

***CENTRIFUGAL PUMPS**

AD-273 413 62-2-5 DIV. 9
FOREIGN TECH. DIV., AIR FORCE SYSTEMS COMMAND, WRIGHT-PATTERSON AIR FORCE BASE, OHIO.
(*FUEL PUMPS, *CENTRIFUGAL PUMPS, *HYDRAULIC PRESSURE PUMPS, VIBRATION, CAVITATION, TESTS, TEST METHODS, USSR, MEASUREMENT, MATHEMATICAL ANALYSIS.)

***CERAMIC CAPACITORS**

AD-273 424 62-2-5 DIV. 6
CORNELL-DUBILIER ELECTRIC CORP., NEW BEDFORD, MASS.
(*CAPACITORS, *CERAMIC CAPACITORS, MATERIALS, *DIELECTRICS, *BARIUM COMPOUNDS, CALCIUM COMPOUNDS, *TITANATES, FLUORINATION, HIGH TEMPERATURE RESEARCH, ENCAPSULATION, MANUFACTURING METHODS, INDUSTRIAL PRODUCTION, DIELECTRIC PROPERTIES.)

***CERAMIC COATINGS**

AD-273 119 62-2-5 DIV. 17
ARMOUR RESEARCH FOUNDATION, CHICAGO, ILL.
(ALLOYS, HEAT RESISTANT ALLOYS, HIGH TEMPERATURE RESEARCH, *VANADIUM ALLOYS, TITANIUM ALLOYS, NIOBIUM ALLOYS, COATINGS, *ANTIOXIDANTS, OXIDATION INHIBITORS, *METAL COATINGS, NICKEL PLATING, *CERAMIC COATINGS, SILICON COATINGS.) (FLAME SPRAYING, ELECTRODEPOSITION, INTERMETALLIC COMPOUNDS, NICKEL COMPOUNDS, YTTRIUM COMPOUNDS, OXIDES, BORON COMPOUNDS, SILICIDES.) (TESTS, MECHANICAL PROPERTIES, DEFORMATION, TENSILE PROPERTIES)

***CERAMIC MATERIALS**

AD-273 184 62-2-5 DIV. 17
DEFENSE METALS INFORMATION CENTER, COLUMBUS, OHIO.
(*BIBLIOGRAPHY, *HEAT RESISTANT ALLOYS, *METALS, *CERAMIC MATERIALS, *REFRACTORY MATERIALS, ALLOYS.) (STAINLESS STEEL, STEEL, IRON ALLOYS, NICKEL ALLOYS, BERYLLIUM, TITANIUM, MAGNESIUM, NIOBIUM, CHROMIUM, MOLYBDENUM, TANTALUM, VANADIUM, TUNGSTEN.) COATINGS.

AD-273 222 62-2-5 DIV. 14
GENERAL DYNAMICS/ASTRONAUTICS, SAN DIEGO, CALIF.
(*CERAMIC MATERIALS, *BRITTLE MATERIALS, SOLIDS, SINGLE CRYSTALS, *DEFORMATION, *PLASTICITY, *MECHANICAL PROPERTIES, PHYSICAL PROPERTIES.) (TEST METHODS, TEST EQUIPMENT.) (*SODIUM COMPOUNDS, CHLORIDES, *MAGNESIUM COMPOUNDS, OXIDES, DATA.) SOLID STATE PHYSICS.

AD-273 276 62-2-5 DIV. 14
VITRO LABS., WEST ORANGE, N. J.
(*REFRACTORY MATERIALS, *CERAMIC MATERIALS, PARTICLES, *POWDER METALS, PREPARATION, VAPORIZATION, CHEMICAL PROPERTIES, PHYSICAL PROPERTIES.) (OXIDES OF ALUMINUM COMPOUNDS, TUNGSTEN COMPOUNDS, MOLYBDENUM COMPOUNDS, IRON COMPOUNDS, MAGNESIUM COMPOUNDS, ZIRCONIUM COMPOUNDS, NIOBIUM COMPOUNDS, SILICON COMPOUNDS, THORIUM COMPOUNDS.) (METALS, MOLYBDENUM, TUNGSTEN, ALUMINUM.) (CARBIDES, TANTALUM COMPOUNDS.)

***CERENKOV RADIATION**

AD-273 415 62-2-5 DIV. 8
ELECTRICAL ENGINEERING RESEARCH LAB., U. OF ILLINOIS, URBANA.
(*RADIOFREQUENCY GENERATORS, *MICROWAVES, *ELECTROMAGNETIC WAVES, MICROWAVE FREQUENCY, *WAVE TRANSMISSION.) (ELECTRON BEAMS, *FREQUENCY MULTIPLIERS, FREQUENCY SHIFT, *CERENKOV RADIATION, *BREMSSTRAHLUNG.) ELECTRONS, PLASMA PHYSICS, DIELECTRICS, *WAVEGUIDES.

***CESIUM**

AD-273 224 62-2-5 DIV. 25
ALLISON DIV., GENERAL MOTORS CORP., INDIANAPOLIS, IND.
(*KINETIC THEORY OF GASES, *CESIUM, GAS FLOW THROUGH CAPILLARY TUBES, FOR *THERMIONIC EMISSION OF IONS, *ELECTRONS, PLASMA PHYSICS.) (TUNGSTEN, MOLYBDENUM, TANTALUM.) (INTEGRAL EQUATIONS, DIFFERENTIAL EQUATIONS, MATRIX ALGEBRA, NUMERICAL ANALYSIS, GREEN'S FUNCTION.) INSTRUMENTATION.

***CESIUM ELECTRON TUBES**

AD-273 067 62-2-5 DIV. 25
GENERAL MOTORS RESEARCH LABS., WARREN, MICH.
(*NUCLEAR ENERGY, FISSION, FISSION PRODUCTS, *PLASMA PHYSICS, THERMIONIC EMISSION.) (DIODES, RARE GASES, ELECTRONS, *ELECTRIC POWER PRODUCTION.) (CATHODES, CESIUM, *CESIUM ELECTRON TUBES.)

***CLIMATE**

AD-273 196 62-2-5 DIV. 2
1ST WEATHER WING, AIR FORCE.
(*CLIMATE AND METEOROLOGICAL DATA OF THE *PHILIPPINE ISLANDS FOR AIR FORCE OPERATIONS AT CLARK AFB.) (CLIMATE OF JAPAN, KOREA, CHINA, MANCHURIA, TAIWAN AND THE PACIFIC OCEAN.)

***COATINGS**

AD-273 080 62-2-5 DIV. 14
MOTOROLA, INC., CHICAGO, ILL.
(*PRINTED CIRCUITS, *COATINGS *PLASTIC COATINGS, EPOXY RESINS, SILICON RESINS, POLYMERS, URETHANES, RESINS ON LAMINATES, GLASS, PAPER, COPPER,) (*ELECTRIC INSULATION, THERMAL INSULATION, MATERIALS, ELECTRICAL PROPERTIES, DIELECTRIC PROPERTIES, ADHESION, CORROSION, MOISTUREPROOFING.) MILITARY REQUIREMENTS.

***COBALT COMPOUNDS**

AD-273 033 62-2-5 DIV. 4
FELTMAN RESEARCH LABS., PICATINNY ARSENAL, DOVER, N. J.
(*COMPLEX IONS, IONS, *COMPLEX COMPOUNDS, CHLORIDES, AMINES, *COBALT COMPOUNDS, DISPLACEMENT REACTIONS, CHEMICAL REACTIONS, RATE, REACTION KINETICS, TEMPERATURE, HYDROGEN ION CONCENTRATION, SPECTROGRAPHIC ANALYSIS.) JAPAN.

***CODING**

AD-273 185 62-2-5 DIV. 30
MICROWAVE RESEARCH INST., POLYTECHNIC INST. OF BROOKLYN, N. Y.
(*CODING, THEORY BY *ALGEBRAS, MATRIX ALGEBRA FOR *DIGITAL COMPUTERS.) (STATISTICAL DISTRIBUTIONS, STATISTICAL TESTS, GROUPS (MATHEMATICS),)

AD-273 403 62-2-5 DIV. 30
FOREIGN TECH. DIV., AIR FORCE SYSTEMS COMMAND WRIGHT-PATTERSON AIR FORCE BASE, OHIO.
(*CODING, SEQUENCES, PROBABILITY, *ERRORS, *INFORMATION THEORY, INEQUALITIES.) (RADIO SIGNALS, TRANSMISSION, *DATA TRANSMISSION SYSTEMS, NOISE (RADIO),) USSR.

***COLORS**

AD-273 228 62-2-5 DIV. 14
GEORGIA INST. OF TECH. ENGINEERING EXPERIMENT STATION, ATLANTA.
(TEXTILES, *COTTON TEXTILES, DYES, *COLORS, STANDARDS, *WEATHERPROOFING, PROCESSING, MEASUREMENT, LIGHT, REFLECTION.) REFLECTOMETERS.

***COMMUNICATION EQUIPMENT**

AD-273 133 62-2-5 DIV. 19
LABORATORY FOR ELECTRONICS, INC., BOSTON, MASS.
(*MINIATURE ELECTRONIC EQUIPMENT, MOBILE, *AIR TRAFFIC CONTROL SYSTEMS, *COMMUNICATION EQUIPMENT, RADIO NAVIGATION, TRAILERS.) (*RADIO COMMUNICATION SYSTEMS, TELETYPE EQUIPMENT, TRANSMITTER RECEIVERS, FACSIMILE RECEIVER CONVERTERS, FACSIMILE RECORDING SYSTEMS, MICROWAVE RELAY SYSTEMS, RADIO RELAY SYSTEMS, ULTRA HIGH FREQUENCY, VERY HIGH FREQUENCY, REDUCTION, PACKAGING, RELIABILITY.)

***COMMUNICATION SYSTEMS**

AD-273 068 62-2-5 DIV. 5
GENERAL MILLS, INC., MINNEAPOLIS, MINN.
(*SATELLITE VEHICLES FOR *COMMUNICATION SYSTEMS, *RADIO COMMUNICATION SYSTEMS.) (REFLECTION, SCATTERING OF MICROWAVES, RADIO WAVES FROM SATELLITE VEHICLES, SPHERES, METALS.) (EFFECT OF GRAVITY, MAGNETIC FIELDS, ELECTROMAGNETIC FIELDS ON SATELLITE VEHICLES.) (DEFORMATION OF STRUCTURAL SHELLS FROM THERMAL STRESSES.) (FEASIBILITY STUDIES OF MATERIALS FOR SURFACES OF SATELLITE VEHICLES.) FEASIBILITY STUDIES OF CONFIGURATION FOR SATELLITE VEHICLES.

***COMMUNICATIONS THEORY**

AD-273 243 62-2-5 DIV. 6
LINCOLN LAB., MASS. INST. OF TECH., LEXINGTON.
(*COMMUNICATIONS THEORY, *STATISTICAL PROCESSES, *STATISTICAL FUNCTIONS, MATHEMATICAL ANALYSIS, TRANSFORMATIONS (MATHEMATICS), *FOURIER ANALYSIS, *SERIES.) (*RADIOMETERS, CALIBRATION, CIRCUITS, SIGNAL-TO-NOISE RATIO.)

***COMPLEX COMPOUNDS**

AD-273 033 62-2-5 DIV. 4
FELTMAN RESEARCH LABS., PICATINNY ARSENAL, DOVER, N. J.
(*COMPLEX IONS, IONS, *COMPLEX COMPOUNDS, CHLORIDES, AMINES, *COBALT COMPOUNDS, DISPLACEMENT REACTIONS, CHEMICAL REACTIONS, RATE, REACTION KINETICS, TEMPERATURE, HYDROGEN ION CONCENTRATION, SPECTROGRAPHIC ANALYSIS.) JAPAN.

AD-273 129 62-2-5 DIV. 4
FELTMAN RESEARCH LABS., PICATINNY ARSENAL, DOVER, N. J.
(SYNTHESIS OF *CATALYSTS, METALORGANIC COMPOUNDS AND SALTS OF *ALUMINUM COMPOUNDS AND *ETHYL RADICALS, *TITANIUM COMPOUNDS AND *HALINES, *COMPLEX COMPOUNDS,) (CATALYSIS, POLYMERIZATION, STEREOCHEMISTRY, MOLECULAR ISOMERISM.)

AD-273 266 62-2-5 DIV. 4
RIAS, INC., BALTIMORE, MD.
(*BORON COMPOUNDS, HYDRIDES, *ORGANOBORANES, *COMPLEX COMPOUNDS, PYRIDINES, *ELECTRON TRANSITIONS, ATOMIC ENERGY LEVELS, QUANTUM MECHANICS.) METALORGANIC COMPOUNDS.

***COMPLEX IONS**

AD-273 033 62-2-5 DIV. 4
FELTMAN RESEARCH LABS., PICATINNY ARSENAL, DOVER, N. J.
(*COMPLEX IONS, IONS, *COMPLEX COMPOUNDS, CHLORIDES, AMINES, *COBALT COMPOUNDS, DISPLACEMENT REACTIONS, CHEMICAL REACTIONS, RATE, REACTION KINETICS, TEMPERATURE, HYDROGEN ION CONCENTRATION, SPECTROGRAPHIC ANALYSIS.) JAPAN.

***COMPUTER LOGIC**

AD-273 440 62-2-5 DIV. 30
STANFORD RESEARCH INST., MENLO PARK, CALIF.
(*DATA PROCESSING SYSTEMS, *DATA STORAGE SYSTEMS, *IDENTIFICATION SYSTEMS, PROGRAMMING, AUTOMATIC TRAINING DEVICES, TEACHING MACHINES, INDEXES, CODING, DOCUMENTATION,) (*MILITARY RESEARCH, *COMPUTER LOGIC, *DIGITAL COMPUTERS,) (TOPOLOGY, AERIAL PHOTOGRAPHY, MAPS, VIDEO NETWORKS,) (EXPERIMENTAL DATA, TABLES, FEASIBILITY STUDIES,) (TRANSFORMATIONS (MATHEMATICS), MATRIX ALGEBRA,)

***COMPUTERS**

AD-273 347 62-2-5 DIV. 30
CALIFORNIA U., LOS ANGELES.
(*MATHEMATICAL COMPUTER DATA, *HUMAN ENGINEERING, *RADAR OPERATORS, BEHAVIOR, TRACKING,) (RADAR TRACKING, CONTROL SYSTEMS,) (*COMPUTERS, LINEAR SYSTEMS, NONLINEAR SYSTEMS, STATISTICAL ANALYSIS,)

***CONICAL BODIES**

AD-273 070 62-2-5 DIV. 25
ISRAEL INST. OF TECH., HAIFA.
(*CONICAL BODIES, *BUCKLING, TEMPERATURE, PRESSURE, *THERMAL STRESSES,) (*TAYLOR'S SERIES, DIFFERENTIAL EQUATIONS, POLYNOMIALS, INTEGRAL EQUATIONS, MATRIX ALGEBRA,)

AD-273 087 62-2-5 DIV. 12
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION, WASHINGTON, D. C.
(FEASIBILITY STUDIES, MANNED, *CONICAL BODIES, BLUNT BODIES, *SATELLITE VEHICLES, RE-ENTRY VEHICLES, AERODYNAMIC CONFIGURATIONS, *SATELLITE VEHICLE TRAJECTORIES, TERMINAL BALLISTICS, ATMOSPHERE ENTRY, AERODYNAMIC HEATING, RE-ENTRY AERODYNAMICS, DYNAMICS, DECELERATION, ACCELERATION TOLERANCE, RECOVERY, MATHEMATICAL ANALYSIS,)

***CONSTRUCTION**

AD-273 202 62-2-5 DIV. 13
ARMY ENGINEER RESEARCH AND DEVELOPMENT LABS., FORT BELVOIR, VA.
(*PROTECTIVE COVERINGS, *SHELTERS, PORTABLE SHELTERS, *CONSTRUCTION, STRUCTURES, DESIGN,) (MILITARY ENGINEERING, STRUCTURES, MATERIALS, BLAST, RESISTANCE, NUCLEAR EXPLOSIONS, ATOMIC BOMB EXPLOSIONS, NUCLEAR WEAPONS, RADIOLOGICAL CONTAMINATION, RADIATION EFFECTS, EFFECTIVENESS, TESTS,)

***CONTAINERS**

AD-273 150 62-2-5 DIV. 12
REED RESEARCH, INC., WASHINGTON, D. C.
(PREPARATION OF STANDARDS AND SPECIFICATIONS FOR DESIGN OF *GUIDED MISSILES, SHIPPING AND STORAGE, *CONTAINERS,) (GUIDED MISSILES, PACKAGING, MILITARY REQUIREMENTS,)

(STANDARDIZATION OF HANDBOOKS FOR DESIGN OF GUIDED MISSILES• CONTAINERS.) (CONTAINERS• SHOCK• VIBRATION• MAINTENANCE• TEST METHODS•

AD-273 151 62-2-5 DIV. 12
REED RESEARCH INC.• WASHINGTON• D. C.
(DESIGN• STANDARDIZATION OF •GUIDED MISSILES• SHIPPING• •CONTAINERS.) (PREPARATION OF •STANDARDS AND •SPECIFICATIONS FOR GUIDED MISSILES• CONTAINERS.) (CONTAINERS• TEST METHODS• TEST EQUIPMENT• TESTS• MILITARY REQUIREMENTS.) (SPECIFICATIONS FOR CORROSION HANDLING• VIBRATION• SHOCK RESISTANCE• TEST.)

AD-273 152 62-2-5 DIV. 12
REED RESEARCH• INC.• WASHINGTON• D. C.
(PREPARATION OF STANDARDS AND SPECIFICATIONS FOR DESIGN OF •GUIDED MISSILES, SHIPPING AND STORAGE• •CONTAINERS.) (GUIDED MISSILES• •PACKAGING• MILITARY REQUIREMENTS.) (STANDARDIZATION OF HANDBOOKS FOR DESIGN OF GUIDED MISSILES• CONTAINERS.)

•CONTROL SYSTEMS

AD-273 024 62-2-5 DIV. 30
MICROWAVE RESEARCH INST.• POLYTECHNIC INST. OF BROOKLYN• N. Y.
(•FEEDBACK• •SENSITIVITY• FUNCTIONS• SIGNAL-TO-NOISE RATIO• •ERRORS.) (•MATHEMATICAL LOGIC• •CONTROL SYSTEMS• RELIABILITY• DESIGN.) (NONLINEAR SYSTEMS• COMMUTATORS• EXPERIMENTAL DATA• TABLES.)

AD-273 318 62-2-5 DIV. 27
NAVAL ORDNANCE TEST STATION• CHINA LAKE• CALIF.
(GUIDED MISSILES• CONTROL AND SPACE FLIGHT• •CONTROL SYSTEMS USING JETS• INJECTION OF GASES• LIQUIDS INTO •ROCKET MOTOR NOZZLES FOR DEFLECTION OF EXHAUST GASES• THRUST.) (TESTS USING •WATER• NITROGEN• TETROXIDES• NITRIC ACID.)

•CONTROL VALVES

AD-273 063 62-2-5 DIV. 26
FREBANK CO.• GLENDALE• CALIF.
(•GAS VALVES• •CONTROL VALVES HYDRAULIC ACTUATORS• SPRINGS• DESIGN• TESTS VIBRATION• TEMPERATURE• ACCELERATION.) (SAFETY VALVES• •PRESSURE REGULATORS• DESIGN• TESTS.) (GUIDED MISSILES• SATELLITE VEHICLES.)

AD-273 064 62-2-5 DIV. 26
FREBANK CO.• GLENDALE• CALIF.
(•SAFETY VALVES• •PRESSURE REGULATORS• HYDRAULIC ACTUATORS• DESIGN• TESTS. GUIDED MISSILES• SOLENOIDS• •CONTROL VALVES) (•GAS VALVES• SPECIFICATIONS• TEST METHODS.)

•COPPER ALLOYS

AD-273 418 62-2-5 DIV. 20
GENERAL DYNAMICS/FORT •URTH• TEX.
(•RADIATION EFFECTS• X-RAYS• GAMMA RAYS• ALPHA PARTICLES• NEUTRONS• BETA PARTICLES• MATERIALS• METALS• SEMICONDUCTORS• OPTICAL MATERIALS• GLASS• PLASTICS• ELASTOMERS• ORGANIC MATERIALS• INORGANIC SUBSTANCES• ELECTRICAL EQUIPMENT• ELECTRONIC EQUIPMENT• ELECTRIC INSULATION.) (NUCLEAR REACTIONS• •STEEL• •ALUMINUM ALLOYS• •COPPER ALLOYS• •NICKEL ALLOYS• ALLOYS.) (RADIOBIOLOGY• •RADIATION HAZARDS• DOSAGE.) (AIRCRAFT• NUCLEAR PROPULSION.)

•COPPER ELECTRODES

AD-273 294 62-2-5 DIV. 9
CENTRAL INST. FOR INDUSTRIAL RESEARCH (NORWAY).
(•COPPER ELECTRODES• •ZINC ELECTRODES• COPPER• ZINC• •ELECTROCHEMISTRY• ELECTRODES• METALS• IONS• •REACTION KINETICS• ACIDS• SOLUTIONS• BROMIDES• CHLORIDES.)

•CORROSION RESEARCH

AD-273 244 62-2-5 DIV. 21
MARTIN CO.• BALTIMORE• MD.
(•NUCLEAR POWER PLANTS• •HEAT EXCHANGERS• MATERIALS• •CORROSION RESEARCH.) (NICKEL• NICKEL ALLOYS• COPPER ALLOYS• CHROMIUM ALLOYS• STAINLESS STEEL• STEEL• MOLYBDENUM ALLOYS.) (TESTS• MODEL TESTS• TEST METHODS• CORROSIVE LIQUIDS• STEAM• CHLORIDES.)

•COSMIC RAY BURSTS

AD-273 079 62-2-5 DIV. 2
MAX-PLANCK-INSTITUT FUR AERONOMIE (GERMANY).
(•X RAYS• •COSMIC RAY BURSTS• INTENSITY• •AURORAE• MAGNETIC EFFECTS• MEASUREMENT.) (•BALLOONS• AIRBORNE• GEIGER COUNTERS• IONIZATION CHAMBERS.)

•COSMIC RAYS

AD-273 079 62-2-5 DIV. 2
MAX-PLANCK-INSTITUT FUR AERONOMIE (GERMANY).
(HIGH ALTITUDE• ATMOSPHERE• IONIZATION• •COSMIC RAYS• •AURORAE• •X RAYS• MEASUREMENT• AIRBORNE• INSTRUMENTATION• ELECTRONIC EQUIPMENT• •RADIATION COUNTERS• BALLOONS.) (PULSE COUNTERS• RADIO TRANSMITTERS• PULSE SUPPLIES• OSCILLATORS• ELECTRIC FILTERS• RADIO RECEIVERS• ELECTRONIC CIRCUITS• PACKAGING.)

•COTTON TEXTILES

AD-273 224 62-2-5 DIV. 14
GEORGIA INST. OF TECH. ENGINEERING EXPERIMENT STATION• ATLANTA.
(TEXTILES• •COTTON TEXTILES• DYES• •COLORS• STANDARDS• •WEATHERPROOFING• PROCESSING• MEASUREMENT• LIGHT• REFLECTION.) REFLECTOMETERS.

•COUPLED ANTENNAS

AD-273 045 62-2-5 DIV. 8
STANFORD RESEARCH INST.• MENLO PARK• CALIF.
(•RADAR ANTENNAS• •COUPLED ANTENNAS• DESIGN USING RADIO INTERFEROMETERS.) (WIRE SCREENS• MICROWAVE FREQUENCY• •LENS ANTENNAS• RADAR SCANNING• ELECTRONIC SCANNERS• THEORY• DESIGN.) (DIRECTION FINDING• COMMUNICATION EQUIPMENT• HIGH FREQUENCY• ANTENNAS.)

•CRYSTAL RECTIFIERS

AD-273 218 62-2-5 DIV. 25
ARIZONA STATE U.• TEMPE.
(•SEMICONDUCTING FILMS• •SEMICONDUCTORS• MATERIALS• CERAMIC MATERIALS• TITANIUM COMPOUNDS• DIOXIDES• COLLOIDS• IMPURITIES• CONDUCTIVITY• •THERMOELECTRICITY• HIGH TEMPERATURE RESEARCH• STABILITY• CRYSTALS• SINGLE CRYSTALS.) •CRYSTAL RECTIFIERS.

•CRYSTALS

AD-273 425 62-2-5 DIV. 14
MATERIALS RESEARCH LAB.• U. OF CALIF.• BERKELEY.
(•LITHIUM COMPOUNDS• •FLUORIDES• IONS• •CRYSTALS• •SINGLE CRYSTALS• CRYSTAL STRUCTURE• LATTICES.) (TESTS• MECHANICAL PROPERTIES• DEFORMATION• PLASTICITY• FRACTURE (MECHANICS)• RUPTURE• FAILURE (MECHANICS)• TENSILE PROPERTIES• BRITTLE MATERIALS.) GROWTH•

AD-273 448 62-2-5 DIV. 25
LABORATORY FOR INSULATION RESEARCH• MASS. INST. OF TECH.• CAMBRIDGE.
(FERROELECTRIC CRYSTALS• •DIELECTRICS• •CRYSTALS• •SINGLE CRYSTALS• LATTICES• PIEZOELECTRIC CRYSTALS• PREPARATION• GROWTH• DIELECTRIC PROPERTIES• ELECTRICAL PROPERTIES• MAGNETIC PROPERTIES• FERROELECTRICITY• SURFACE PROPERTIES• HIGH TEMPERATURE RESEARCH.) (X-RAY DIFFRACTION ANALYSIS• MASS SPECTROSCOPY• LIGHT• AMPLIFIERS• MASERS• OPTICAL SYSTEMS.) (ALKALINE EARTH COMPOUNDS• ALKALI METAL COMPOUNDS• GARNETS• HALIDES.)

•CYCLOTRONS

AD-273 426 62-2-5 DIV. 20
CALIFORNIA U.• LOS ANGELES.
(•CYCLOTRONS• CYCLOTRON MAGNETS• MAGNETIC FIELDS• RADIOFREQUENCY OSCILLATORS.) (PROTON BEAMS• PROTONS• ATOMIC ORBITALS• ION BEAMS.)

•CYLINDRICAL BODIES

AD-273 054 62-2-5 DIV. 25
MICROWAVE RESEARCH INST.• POLYTECHNIC INST. OF BROOKLYN• N. Y.
(•ELECTROMAGNETIC FIELDS• •PROPAGATION• ANALYSIS• •SYNTHESIS• •WAVEGUIDES.) (•SPHERES• •CYLINDRICAL BODIES• •GREEN'S FUNCTION• VECTOR ANALYSIS.) (•PHYSICS• PARTIAL DIFFERENTIAL EQUATIONS.) (COMPLEX VARIABLES• FUNCTIONS• TRANSFORMATIONS (MATHEMATICS)• BESSEL FUNCTIONS• INTEGRAL EQUATIONS.)

AD-273 312 62-2-5 DIV. 9
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION• •WASHINGTON• D. C.
(•BODIES OF REVOLUTION• •CYLINDRICAL BODIES• SUPERSONICS• AERODYNAMICS• EXHAUST GASES• •JETS• INTERFERENCE• PRESSURE• SHOCK WAVES• MODEL TESTS• •WIND TUNNEL MODELS.) (DECELERATION• AERODYNAMIC HEATING• DRAG• REDUCTION.) (RE-ENTRY VEHICLES• HYPERVELOCITY GUIDED MISSILES• CONTROL• STAGING.) (NOZZLES• SUPERSONIC NOZZLES.)

•DAMPING

AD-273 153 62-2-5 DIV. 25
RAND CORP.• SANTA MONICA• CALIF.
(TRANSPORT PROPERTIES AND •DAMPING OF •PLASMA OSCILLATIONS• •ELECTROMAGNETIC WAVES.)

•DATA PROCESSING SYSTEMS

AD-273 144 62-2-5 DIV. 1
NATIONAL AVIATION FACILITIES EXPERIMENTAL CENTER• ATLANTIC CITY• N. J.
(DESCRIPTORS• •AIRPLANE LANDINGS• •VOICE COMMUNICATION SYSTEMS• •AIR TRAFFIC CONTROL SYSTEMS• •AUTOMATIC NAVIGATORS• •FLIGHT SIMULATORS• HEIGHT FINDING• DIRECTION FINDING• DETECTION• DISPLAY SYSTEMS• GLIDE PATH SYSTEMS• APPROACH LIGHTS• RUNWAYS• GROUND SPEED INDICATORS• RADIO COMMUNICATION SYSTEMS• PARAMETRIC AMPLIFIERS• •DATA PROCESSING SYSTEMS• DISPLAY SYSTEMS• RADAR EQUIPMENT• •SAFETY• SIMULATION• THEORY• GROUND CONTROLLED RADAR.
DOPPLER SYSTEMS• ANTENNAS• DIRECTION FINDING•

AD-273 235 62-2-5 DIV. 30
LITTON SYSTEMS• INC.• •ALTHAM• MASS.
(•PROGRAMMING• PATTERN RECOGNITION• •SAMPLING• •DATA PROCESSING SYSTEMS• AUTOMATIC• DECISION THEORY• •STATISTICAL ANALYSIS.) (DIGITAL COMPUTERS• TESTS• SIGNAL-TO-NOISE RATIO.) (INTEGRAL EQUATIONS• MATRIX ALGEBRA• TIME• •TRANSFORMATIONS (MATHEMATICS)• SEQUENCES• TAYLOR'S SERIES• STATISTICAL DISTRIBUTIONS• PROBABILITY• INEQUALITIES.)

AD-273 348 62-2-5 DIV. 30
CALIFORNIA U.• LOS ANGELES.
(ANALYSIS OF •DATA PROCESSING SYSTEMS• •SAMPLING• FEEDBACK• CONTROL SYSTEMS.) (•DIFFERENCE EQUATIONS• TRANSFORMATIONS (MATHEMATICS)• INTEGRATION• MATRIX ALGEBRA.)

AD-273 414 62-2-5 DIV. 30
THOMAS J. WATSON RESEARCH CENTER• YORKTOWN HEIGHTS• N. Y.
(•DIGITAL COMPUTERS• CODING• •LANGUAGE• •TRANSLATIONS• •DATA PROCESSING SYSTEMS• AUTOMATION.)

AD-273 440 62-2-5 DIV. 30
STANFORD RESEARCH INST.• MENLO PARK• CALIF.
(•DATA PROCESSING SYSTEMS• •DATA STORAGE SYSTEMS• •IDENTIFICATION SYSTEMS• PROGRAMMING• AUTOMATIC• TRAINING DEVICES• TEACHING MACHINES• INDEXES• CODING• DOCUMENTATION.) (•MILITARY RESEARCH• •COMPUTER LOGIC• •DIGITAL COMPUTERS.) (TOPOLOGY• AERIAL PHOTOGRAPHY• MAPS• VIDEO NETWORKS.) (EXPERIMENTAL DATA• TABLES• FEASIBILITY STUDIES.) (TRANSFORMATIONS (MATHEMATICS)• MATRIX ALGEBRA.)

•DATA STORAGE SYSTEMS

AD-273 440 62-2-5 DIV. 30
STANFORD RESEARCH INST.• MENLO PARK• CALIF.
(•DATA PROCESSING SYSTEMS• •DATA STORAGE SYSTEMS• •IDENTIFICATION SYSTEMS• PROGRAMMING• AUTOMATIC• TRAINING DEVICES• TEACHING MACHINES• INDEXES• CODING• DOCUMENTATION.) (•MILITARY RESEARCH• •COMPUTER LOGIC• •DIGITAL COMPUTERS.) (TOPOLOGY• AERIAL PHOTOGRAPHY• MAPS• VIDEO NETWORKS.) (EXPERIMENTAL DATA• TABLES• FEASIBILITY STUDIES.) (TRANSFORMATIONS (MATHEMATICS)• MATRIX ALGEBRA.)

•DATA TRANSMISSION SYSTEMS

AD-273 403 62-2-5 DIV. 30
FOREIGN TECH. DIV.• AIR FORCE SYSTEMS COMMAND •RIGHT-PATTERSON AIR FORCE BASE• OHIO.
(•CODING• SEQUENCES• PROBABILITY• •ERRORS• •INFORMATION THEORY• INEQUALITIES.) (RADIO SIGNALS• TRANSMISSION• •DATA TRANSMISSION SYSTEMS• NOISE (RADIO).) USSR.

•DECONTAMINATION KITS

AD-273 039 62-2-5 DIV. 3
ARMY CHEMICAL RESEARCH AND DEVELOPMENT LABS.• ARMY CHEMICAL CENTER• MD.
(•PROTECTIVE CLOTHING• IMPREGNATION• •DECONTAMINATION KITS• DESIGN.) (TEST METHODS• DECONTAMINATION• TEMPERATURE)

•DEFORMATION

AD-273 222 62-2-5 DIV. 14
GENERAL DYNAMICS/ASTRONAUTICS• SAN DIEGO• CALIF.
(•CERAMIC MATERIALS• •BRITTLE MATERIALS• SOLIDS• SINGLE CRYSTALS• •DEFORMATION• •PLASTICITY• MECHANICAL PROPERTIES• PHYSICAL PROPERTIES.) (TEST METHODS• TEST EQUIPMENT.) (•SODIUM COMPOUNDS• CHLORINES• •MAGNESIUM COMPOUNDS• OXIDES• DATA.) SOLID STATE PHYSICS•

•DELAY ELEMENTS

AD-273 042 62-2-5 DIV. 3
DIAMOND ORDNANCE FUZE LABS.• •WASHINGTON• D. C.
(•PYROTECHNICS• •DELAY ELEMENTS• •DELAY POWDERS FOR BOMB FUZES• DESIGN• TEST• TEST METHODS.) (MATERIALS• CHROMATES• BARIUM COMPOUNDS• IRON COMPOUNDS• OXIDES• MANGANESE COMPOUNDS• LEAD COMPOUNDS• ZIRCONIUM COMPOUNDS• COMBUSTION• STORAGE• STABILITY.) IGNITERS• PRIMERS• HEATING ELEMENTS.

***DELAY POWDERS**

AD-273 092 62-2-5 DIV. 3
DIAMOND ORDNANCE FUZE LABS., *WASHINGTON, D. C.
(*PYROTECHNICS, *DELAY ELEMENTS, *DELAY POWDERS FOR BOMB FUZES, DESIGN, TEST TECHNIQUES.) (MATERIALS, CHROMATES, BARIUM COMPOUNDS, IRON COMPOUNDS, OXIDES, MANGANESE COMPOUNDS, LEAD COMPOUNDS, ZIRCONIUM COMPOUNDS, COMBUSTION, STORAGE, STABILITY.) IGNITERS, PRIMERS, HEATING ELEMENTS.

***DEMOLITION**

AD-273 402 62-2-5 DIV. 25
FOREIGN TECH. DIV., AIR FORCE SYSTEMS COMMAND, WRIGHT-PATTERSON AIR FORCE BASE, OHIO.
(*SEISMIC WAVES, PROPAGATION, *UNDERGROUND EXPLOSIONS, USSR, *WAVE TRANSMISSION.) (SOLIDS, *DEMOLITION.)

***DETECTION**

AD-273 262 62-2-5 DIV.
TRACERLAB, INC., *WALTHAM, MASS.
(*FEASIBILITY STUDY, *PROPELLANTS, *DETECTION IN THE ATMOSPHERE BY *RADIOACTIVATION ANALYSIS.) (GASES, *RADIOACTIVE ISOTOPES, KRYPTON, OXIDATION-REDUCTION REACTIONS.)

***DIELECTRIC PROPERTIES**

AD-273 066 62-2-5 DIV. 25
ADVANCED ELECTRONICS CENTER, GENERAL ELECTRIC CO., ITHACA, N. Y.
(*WAVEGUIDES, *SEMICONDUCTORS, PHOTOELECTRIC SHUTTERS, *DIELECTRIC PROPERTIES.) (ANTENNAS, METALLIC CRYSTALS, DIODES.) (MICROWAVES, *CAPACITANCE BRIDGES.)

***DIELECTRICS**

AD-273 138 62-2-5 DIV. 8
MOTOROLA, INC., PHOENIX, ARIZ.
(*TRANSISTORS, *DIELECTRICS, *GERMANIUM, *SILICON, *SEMICONDUCTORS, SURFACES, SURFACE PROPERTIES, DIELECTRIC PROPERTIES.) (PROCESSING, AGING, ENCAPSULATION, CONTROLLED ATMOSPHERES, CONTROL OF WATER VAPOR WITH BARIUM COMPOUNDS, OXIDES, NITROGEN, OXYGEN, HYDROGEN COMPOUNDS, BORON COMPOUNDS, DIOXIDES.) (OXIDATION, SILICON, SILICON COMPOUNDS, DIOXIDES, TEMPERATURE.)

AD-273 291 62-2-5 DIV. 25
BROWN U., PROVIDENCE, R. I.
(*OPTICS, *GEOMETRY, SCATTERING, LIGHT, DIFFRACTION, REFLECTION, WAVE TRANSMISSION IN *DIELECTRICS, CYLINDRICAL BODIES) (TAYLOR'S SERIES, WAVE ANALYSIS, FUNCTIONS.)

AD-273 424 62-2-5 DIV. 8
CORNELL-DUBILIER ELECTRIC CORP., NEW BEDFORD, MASS.
(*CAPACITORS, *CERAMIC CAPACITORS, MATERIALS, *DIELECTRICS, *BARIUM COMPOUNDS, CALCIUM COMPOUNDS, *TITANATES, FLUORINATION, HIGH TEMPERATURE RESEARCH, ENCAPSULATION, MANUFACTURING METHODS, INDUSTRIAL PRODUCTION, DIELECTRIC PROPERTIES.)

AD-273 448 62-2-5 DIV. 25
LABORATORY FOR INSULATION RESEARCH, MASS. INST. OF TECH., CAMBRIDGE.
(FERROELECTRIC CRYSTALS, *DIELECTRICS, *CRYSTALS, *SINGLE CRYSTALS, LATTICES, PIEZOELECTRIC CRYSTALS, PREPARATION, GROWTH, DIELECTRIC PROPERTIES, ELECTRICAL PROPERTIES, MAGNETIC PROPERTIES, FERROELECTRICITY, SURFACE PROPERTIES, HIGH TEMPERATURE RESEARCH.) (X-RAY DIFFRACTION ANALYSIS, MASS SPECTROSCOPY, LIGHT, AMPLIFIERS, MASERS, OPTICAL SYSTEMS.) (ALKALINE EARTH COMPOUNDS, ALKALI METAL COMPOUNDS, GARNETS, HALIDES.)

***DIES**

AD-273 191 62-2-5 DIV. 26
ALLEGHENY LUDLUM STEEL CORP., BRACKENRIDGE, PA.
(*EXTRUSION, FORGING, *MOLYBDENUM ALLOYS (TZM), TITANIUM ALLOYS, ZIRCONIUM ALLOYS.) (SURFACE PROPERTIES, MICROSTRUCTURE, CRYSTAL STRUCTURE.) (METAL FORMING PRESSES, *DIES, COATINGS, LUBRICATION, DESIGN, HEAT TREATMENT.)

***DIFFERENCE EQUATIONS**

AD-273 348 62-2-5 DIV. 30
CALIFORNIA U., LOS ANGELES.
(ANALYSIS OF *DATA PROCESSING SYSTEMS, *SAMPLING, FEEDBACK, CONTROL SYSTEMS.) (*DIFFERENCE EQUATIONS, TRANSFORMATONS (MATHEMATICS), INTEGRATION, MATRIX ALGEBRA.)

***DIFFRACTION**

AD-273 025 62-2-5 DIV. 25
MICROWAVE RESEARCH INST., POLYTECHNIC INST. OF BROOKLYN, N. Y.
(*ELECTROMAGNETIC THEORY, *QUANTUM MECHANICS.) (*ELECTROMAGNETIC WAVES, *DIFFRACTION, *OPERATORS (MATHEMATICS), *TRANSFORMATIONS (MATHEMATICS), VECTOR ANALYSIS, MATRIX ALGEBRA, ALGEBRA, GREEN'S FUNCTION, PERTURBATION THEORY.)

***DIFFUSION**

AD-273 069 62-2-5 DIV. 25
INSTITUTO NACIONAL DE TECNICA AERONAUTICA (SPAIN).
(*LAMINAR BOUNDARY LAYER, *FLAMES, *DIFFUSION, SPECIFIC HEAT, CONDUCTIVITY, CHEMICAL REACTIONS, KINETIC THEORY, FUELS, OXIDIZERS.) (DIFFERENTIAL EQUATIONS, INTEGRAL EQUATIONS, GREEN'S FUNCTION, POLYNOMIALS.) STRUCTURES OF FLAMES.

***DIGITAL COMPUTERS**

AD-273 145 62-2-5 DIV. 25
RESEARCH LAB. OF ELECTRONICS, MASS. INST. OF TECH., CAMBRIDGE.
(*SOLID STATE PHYSICS, ELECTRON BEAMS, *THIN FILMS, *MAGNETO-OPTIC ROTATION, COBALT, DIELECTRICS, FERROMAGNETIC MATERIAL, MAGNETIC EFFECTS, PERTURBATION THEORY.) (MOLECULAR STRUCTURE, FEEDBACK.) (LATTICES, CRYSTAL STRUCTURE, INTERMETALLIC COMPOUNDS, TIN COMPOUNDS, COPPER COMPOUNDS, IRON COMPOUNDS, ALGEBRA.) (COMPUTERS, *DIGITAL COMPUTERS.) COMPUTER SYSTEMS THEORY.

AD-273 185 62-2-5 DIV. 30
MICROWAVE RESEARCH INST., POLYTECHNIC INST. OF BROOKLYN, N. Y.
(*CODING, THEORY BY *ALGEBRAS, MATRIX ALGEBRA FOR *DIGITAL COMPUTERS.) (STATISTICAL DISTRIBUTIONS, STATISTICAL TESTS GROUPS (MATHEMATICS).)

AD-273 414 62-2-5 DIV. 30
THOMAS J. WATSON RESEARCH CENTER, YORKTOWN HEIGHTS, N. Y.
(*DIGITAL COMPUTERS, CODING, *LANGUAGE, *TRANSLATIONS, *DATA PROCESSING SYSTEMS, AUTOMATION.)

***DIGITAL SYSTEMS**

AD-273 114 62-2-5 DIV. 2
MASSACHUSETTS INST. OF TECH., CAMBRIDGE.
(*SEISMIC WAVES, *SEISMOGRAPHS, SPECTROGRAPHIC ANALYSIS.) (MAGNETIC TAPES, SEISMOGRAPHS, *DIGITAL SYSTEMS.) (UNDERGROUND EXPLOSIONS, DETECTION.)

***DIODES**

AD-273 130 62-2-5 DIV. 8
INTERNATIONAL RECTIFIER CORP., LOS ANGELES, CALIF.
(*RECTIFIERS, *SILICON, *DIODES, ELECTRON TUBES, SEMICONDUCTORS, THERMODYNAMICS, TESTS, TEST METHODS, CIRCUIT TESTERS, RELIABILITY.)
DESIGN, PRODUCTION, *MANUFACTURING METHODS.

***DIPOLE ANTENNAS**

AD-273 123 62-2-5 DIV. 8
AIRBORNE INSTRUMENTS LAB., INC., DEER PARK, LONG ISLAND, N. Y.
(*MICROWAVES, *RADIO TRANSMITTERS, MEASUREMENT, *DIPOLE ANTENNAS, CIRCUITS, ELECTRIC FIELDS, WAVEGUIDES, TRANSMISSION LINES, *MICROWAVE NETWORKS.)

***DIRECTION FINDING**

AD-273 157 62-2-5 DIV. 6
SOUTHWEST RESEARCH INST., SAN ANTONIO, TEX.
(*DIRECTION FINDING, BEARING FINDING, HIGH FREQUENCY, *ANTENNAS, AIRCRAFT, RADIO RECEPTION, ANTENNA RADIATION PATTERNS, EFFECTIVENESS, TESTS.)

***DISCHARGE TUBES**

AD-273 249 62-2-5 DIV. 25
MINNESOTA U., MINNEAPOLIS.
(*GAS DISCHARGES, NOISE, THEORY.) (*ELECTROMAGNETIC WAVES, MEASUREMENT, *PLASMA PHYSICS, BREMSSTRAHLUNG, HIGH FREQUENCY, *MICROWAVE TRANSMISSION.) (*GAS IONIZATION, ELECTRONS, ENERGY, IONS, *DISCHARGE TUBES.)

***DISPERSION HARDENING**

AD-273 142 62-2-5 DIV. 17
NEW ENGLAND MATERIALS LAB., INC., MEDFORD, MASS.
(HEAT RESISTANT ALLOYS, *REFRACTORY MATERIALS, *DISPERSION HARDENING, OXIDATION, POWDER ALLOYS, POWDER METALS, *POLYDENUM ALLOYS, TITANIUM ALLOYS.) (POLYDENUM COMPOUNDS, TITANIUM COMPOUNDS, DIOXIDES, OXIDES, SINTERING, DIFFUSION.) ALLOYS, METALS.

AD-273 314 62-2-5 DIV. 17
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION, WASHINGTON, D. C.
(ALLOYS, METALS, OXIDES, *DISPERSION HARDENING OF *NICKEL ALLOYS WITH *MAGNESIUM COMPOUNDS, MIXTURES, BALL MILLS, POWDER METALS, POWDER METALLURGY, PROCESSING, SINTERING, EXTRUSION.) METAL FORMING PRESSES, DENSITY, CHEMICAL IMPURITIES.

***DISPLAY SYSTEMS**

AD-273 321 62-2-5 DIV. 30
MARTIN CO., BALTIMORE, MD.
(STATISTICAL TESTS OF FLIGHT INSTRUMENTS, *DISPLAY SYSTEMS, INSTRUMENT DIALS, CONTROL PANELS, INSTRUMENT PANELS, NUMBERS, CODING, DESIGN, EFFECTIVENESS FOR PILOTS, READING, HUMAN ENGINEERING.) (STATISTICAL ANALYSIS, SAMPLING, PUBLIC OPINION POLLS.)

AD-273 446 62-2-5 DIV. 1
MARTIN CO., BALTIMORE, MD.
(*FLIGHT INSTRUMENTS, CONTROL PANELS, INSTRUMENT PANELS, INSTRUMENT DIALS, *DISPLAY SYSTEMS, NUMBERS, CODING, DESIGN, EFFECTIVENESS, PILOTS, READING, HUMAN ENGINEERING, STATISTICAL TESTS.) (STATISTICAL ANALYSIS, SAMPLING, PUBLIC OPINION POLLS.) ALL-WEATHER AVIATION, INSTRUMENT LANDINGS.

***DISSOCIATION**

AD-273 103 62-2-5 DIV. 9
CORNELL AERONAUTICAL LAB., INC., BUFFALO, N. Y.
(*RE-ENTRY AERODYNAMICS, *AERODYNAMIC HEATING, GASES, *NITROGEN, *OXYGEN, VIBRATION, *DISSOCIATION, RELAXATION TIME, REACTION KINETICS, THEORY.)

***DRIFT**

AD-273 433 62-2-5 DIV. 2
AMERICAN METEOROLOGICAL SOCIETY, BOSTON, MASS.
(*IONOSPHERIC DISTURBANCES, *ELECTROMAGNETIC FIELDS, REFLECTION, *DRIFT, WIND.) (STATISTICAL PROCESSES, *STATISTICAL FUNCTIONS.) USSR.

***EARTH**

AD-273 183 62-2-5 DIV. 2
DECO ELECTRONICS, INC., BOULDER, COLO.
(*EARTH, BOUNDARY LAYER, ATMOSPHERE, TERRAIN, *ELECTRICAL PROPERTIES.) (TERRESTRIAL MAGNETISM, ELECTRICAL CONDUCTANCE.)

AD-273 234 62-2-5 DIV. 2
HAMBURG U. (GERMANY).
(*GRAVITY OF THE *EARTH.) (GEOLOGY, PHYSICS, OCEANOGRAPHY, ASTRONOMY.) (*RELATIVITY THEORY, QUANTUM MECHANICS, TRANSFORMATIONS (MATHEMATICS), PERTURBATION THEORY.)

***EARTH MODELS**

AD-273 229 62-2-5 DIV. 13
IOWA STATE U. OF SCIENCE AND TECH., AMES.
(*UNDERGROUND STRUCTURES, *SOILS, *EARTH MODELS, BLAST, LOAD DISTRIBUTION, PRESSURE, STRESSES, SIMULATION, IMPACT SHOCK MATHEMATICAL ANALYSIS, MODEL TESTS.)

***ELASTICITY**

AD-273 220 62-2-5 DIV. 17
GENERAL DYNAMICS/ASTRONAUTICS, SAN DIEGO, CALIF.
(*ELASTICITY, MEASUREMENT OF *STAINLESS STEEL BY ULTRASONICS AT CRYOGENICS TEMPERATURES.) (METALS, SOUND TRANSMISSION, VELOCITY, COPPER.) LOW TEMPERATURE RESEARCH, SOLID STATE PHYSICS, TEST EQUIPMENT, INSTRUMENTATION, ALLOYS.

***ELASTOMERS**

AD-273 290 62-2-5 DIV. 14
BORDEN CO., PHILADELPHIA, PA.
(*ELASTOMERS, SYNTHETIC RUBBER, *SILICONES, *REINFORCING MATERIALS, HIGH TEMPERATURE RESEARCH.) (SILICONES, CHEMICAL REACTIONS, HYDROLYSIS, PHENYL RADICALS, CHLORIDES, SILANES OR CYANATES OR TITANIUM COMPOUNDS.) (MECHANICAL PROPERTIES, TENSILE PROPERTIES, ELASTICITY, VISCOSITY, HARDNESS, TEMPERATURE, STABILITY.)

•ELECTRIC ARCS

AD-273 032 62-2-5 DIV. 23
VITRO LABS., WEST ORANGE, N. J.
(•SOLAR SPECTRUM, SIMULATION, PLASMA PHYSICS, •ELECTRIC ARCS.) (ELECTRIC ARCS, GASES, ARGON.) •BLACKBODY RADIATION.

•ELECTRIC INSULATION

AD-273 080 62-2-5 DIV. 14
MOTOROLA, INC., CHICAGO, ILL.
(•PRINTED CIRCUITS, •COATINGS •PLASTIC COATINGS, EPOXY RESINS, SILICONE RESINS, POLYMERS, URETHANES, RESINS ON LAMINATES, GLASS, PAPER, COPPER.) (•ELECTRIC INSULATION, THERMAL INSULATION, MATERIALS, ELECTRICAL PROPERTIES, DIELECTRIC PROPERTIES, ADHESION, CORROSION, MOISTUREPROOFING.) MILITARY REQUIREMENTS.

•ELECTRIC MOTORS

AD-273 286 62-2-5 DIV. 7
ARINC RESEARCH CORP., •WASHINGTON, D. C.
(•ELECTRICAL EQUIPMENT, MILITRY EQUIPMENT, •RELIABILITY, MATHEMATICAL PREDICTION.) (•ELECTRIC MOTORS, ALTERNATING CURRENT, DIRECT CURRENT, SYNCHRO RECEIVERS, •MOTOR GENERATORS, •SERVO MOTORS, •SYNCHROS, •FAILURE (MECHANICS), AIRBORNE, SHIPBORNE, BEARINGS, LUBRICATION, BRUSHES, ANALYSIS.)

•ELECTRIC POWER PRODUCTION

AD-273 067 62-2-5 DIV. 25
GENERAL MOTORS RESEARCH LABS., WARREN, MICH.
(•NUCLEAR ENERGY, FISSION, FISSION PRODUCTS, •PLASMA PHYSICS, THERMIONIC EMISSION.) (DIODES, RARE GASES, ELECTRONS, •ELECTRIC POWER PRODUCTION.) (CATHODES, CESIUM, •CESIUM ELECTRON TUBES.)

•ELECTRICAL EQUIPMENT

AD-273 286 62-2-5 DIV. 7
ARINC RESEARCH CORP., •WASHINGTON, D. C.
(•ELECTRICAL EQUIPMENT, MILITARY EQUIPMENT, •RELIABILITY, MATHEMATICAL PREDICTION.) (•ELECTRIC MOTORS, ALTERNATING CURRENT, DIRECT CURRENT, SYNCHRO RECEIVERS, •MOTOR GENERATORS, •SERVO MOTORS, •SYNCHROS, •FAILURE (MECHANICS), AIRBORNE, SHIPBORNE, BEARINGS, LUBRICATION, BRUSHES, ANALYSIS.)

•ELECTRICAL NETWORKS

AD-273 122 62-2-5 DIV. 8
CASE INST. OF TECH., CLEVELAND, OHIO.
(•ELECTRICAL NETWORKS, THEORY, TRANSFORMATIONS (MATHEMATICS), •MATRIX ALGEBRA.)

AD-273 317 62-2-5 DIV. 8
NORWEGIAN DEFENCE RESEARCH ESTABLISHMENT.
(•ELECTRICAL NETWORKS, LINEAR SYSTEMS, THEORY, IMPEDANCE.) MATRIX ALGEBRA.

AD-273 416 62-2-5 DIV. 8
ELECTRICAL ENGINEERING RESEARCH LAB., U. OF ILLINOIS, URBANA.
(•ELECTRICAL NETWORKS, SYNTHESIS •SWITCHING CIRCUITS, •PROGRAMMING, •TRANSISTORS, DIODES, FEEDBACK, LINEAR SYSTEMS.) (•POLYNOMIALS, LEAST SQUARES METHOD, SERIES PROBABILITY, TABLES, EXPERIMENTAL DATA.)

•ELECTRICAL PROPERTIES

AD-273 183 62-2-5 DIV. 2
DECO ELECTRONICS, INC., BOULDER, COLO.
(•EARTH, BOUNDARY LAYER, ATMOSPHERE, TERRAIN, •ELECTRICAL PROPERTIES.) (TERRESTRIAL MAGNETISM, ELECTRICAL CONDUCTANCE.)

•ELECTROCHEMISTRY

AD-273 294 62-2-5 DIV. 4
CENTRAL INST. FOR INDUSTRIAL RESEARCH (NORWAY).
(•COPPER ELECTRODES, •ZINC ELECTRODES, COPPER, ZINC, •ELECTROCHEMISTRY, ELECTRODES, METALS, IONS, •REACTION KINETICS, ACIDS, SOLUTIONS, BROMIDES, CHLORIDES.)

•ELECTROLYTES

AD-273 410 62-2-5 DIV. 17
FOREIGN TECH. DIV., AIR FORCE SYSTEMS COMMAND, WRIGHT-PATTERSON AIR FORCE BASE, OHIO.
(•ALLOYS, •METALS, •HEATING IN •ELECTROLYTES OF ELECTRIC CURRENTS OR ELECTRIC POTENTIAL, TEXTBOOKS.) (INDUSTRIAL EQUIPMENT, AUTOMATION, INDUSTRIAL PLANTS, USSR.) (HANDLING, SOLDERING, WELDING, METAL FORMING PRESSES.)

•ELECTROLYTIC CELLS

AD-273 049 62-2-5 DIV. 7
LOCKHEED AIRCRAFT CORP., SUNNYVALE, CALIF.
(•FUEL CELLS, •WET CELLS, •ELECTROLYTIC CELLS, ELECTRODES, •ANODES (ELECTROLYTIC CELL), •CATHODES (ELECTROLYTIC CELL), CATALYSTS, PLATINUM, •FUELS, •AMMONIA, ETHYLENE, •ALCOHOLS, •UREA, ELECTROLYTES, POTASSIUM COMPOUNDS, HYDROXIDES, CARBONATES.)

•ELECTROMAGNETIC FIELDS

AD-273 054 62-2-5 DIV. 25
MICROWAVE RESEARCH INST., POLYTECHNIC INST. OF BROOKLYN, N. Y.
(•ELECTROMAGNETIC FIELDS, •PROPAGATION, ANALYSIS, •SYNTHESIS, •WAVEGUIDES.) (•SPHERES, •CYLINDRICAL BODIES, •GREEN'S FUCTION, VECTOR ANALYSIS.) (•PHYSICS, PARTIAL DIFFERENTIAL EQUATIONS.) (COMPLEX VARIABLES, FUNCTIONS, TRANSFORMATIONS (MATHEMATICS), BESSEL FUNCTIONS, INTEGRAL EQUATIONS.)

AD-273 072 62-2-5 DIV. 25
LINCOLN LAB., MASS. INST. OF TECH., LEXINGTON.
(ATMOSPHERE ENTRY, RE-ENTRY VEHICLES, •PLASMA PHYSICS, •RE-ENTRY AERODYNAMICS, •MAGNETOHYDRODYNAMICS.) (•ELECTROMAGNETIC FIELDS, •GAS IONIZATION, ELECTRONS, DENSITY, MEASUREMENT IN TURBULENT FLOW, WAKE, SHOCK WAVES, ABLATION.) (WAVE TRANSMISSION, REFLECTION, S BAND, ULTRA HIGH FREQUENCY, RADAR TRACKING, RADAR SIGNALS.) (TELEMETER SYSTEMS, DATA PROCESSING SYSTEMS, PROGRAMMING, DIGITAL COMPUTERS.) (INSTRUMENTATION, PHOTOGRAPHY, SCHLIEREN PHOTOGRAPHY.) OPTICAL TRACKING.

AD-273 433 62-2-5 DIV. 2
AMERICAN METEOROLOGICAL SOCIETY, BOSTON, MASS.
(•IONOSPHERIC DISTURBANCES, •ELECTROMAGNETIC FIELDS, REFLECTION, •DRIFT, •IND.) (STATISTICAL PROCESSES, •STATISTICAL FUNCTIONS.) USSR.

•ELECTROMAGNETIC THEORY

AD-273 025 62-2-5 DIV. 25
MICROWAVE RESEARCH INST., POLYTECHNIC INST. O BROOKLYN, N. Y.
(•ELECTROMAGNETIC THEORY, •QUANTUM MECHANICS.) (•ELECTROMAGNETIC WAVES, •DIFFRACTION, •OPERATORS (MATHEMATICS), •TRANSFORMATIONS (MATHEMATICS), VECTOR ANALYSIS, MATRIX ALGEBRA, ALGEBRA, GREEN'S FUNCTION, PERTURBATION THEORY.)

•ELECTROMAGNETIC WAVES

AD-273 025 62-2-5 DIV. 25
MICROWAVE RESEARCH INST., POLYTECHNIC INST. O BROOKLYN, N. Y.
(•ELECTROMAGNETIC THEORY, •QUANTUM MECHANICS.) (•ELECTROMAGNETIC WAVES, •DIFFRACTION, •OPERATORS (MATHEMATICS), •TRANSFORMATIONS (MATHEMATICS), VECTOR ANALYSIS, MATRIX ALGEBRA, ALGEBRA, GREEN'S FUNCTION, PERTURBATION THEORY.)

AD-273 189 62-2-5 DIV. 25
MICROWAVE RESEARCH INST., POLYTECHNIC INST. OF BROOKLYN, N. Y.
(•ELECTROMAGNETIC WAVES, •SCATTERING, •PLASMA PHYSICS, COMPRESSION SHOCK, ACOUSTICS, OPTICS, WAVE TRANSMISSION, AIR.) (GAS IONIZATION, MAGNETIC FIELDS, REFLECTION, SURFACE PROPERTIES, •PROPAGATION.) (DIFFERENTIAL EQUATIONS, TRANSFORMATIONS (MATHEMATICS), PARTIAL DIFFERENTIAL EQUATIONS.)

AD-273 225 62-2-5 DIV. 30
HRB-SINGER, INC., STATE COLLEGE, PA.
(RADIOFREQUENCY, MICROWAVE FREQUENCY, •ELECTROMAGNETIC WAVES, •WAVE TRANSMISSION, •ANECHOIC CHAMBERS, DESIGN, SPECIFICATIONS, INSTRUMENTATION.) (•TEST FACILITIES FOR RADIOFREQUENCY, INTERFERENCE, MEASUREMENT, ANTENNA RADIATION PATTERNS, ELECTROMAGNETIC SHIELDING, RESONANCE ABSORPTION, MATERIALS.)

AD-273 249 62-2-5 DIV. 25
MINNESOTA U., MINNEAPOLIS.
(•GAS DISCHARGES, NOISE, THEORY.) (•ELECTROMAGNETIC WAVES, MEASUREMENT, •PLASMA PHYSICS, BREMSSTRAHLUNG, HIGH FREQUENCY, MEDIUM WAVE TRANSMISSION.) (•GAS IONIZATION, ELECTRONS, ENERGY, IONS, •DISCHARGE TUBES.)

AD-273 272 62-2-5 DIV. 8
AIRBORNE INSTRUMENTS LAB., INC., JEER PARK, LONG ISLAND, N. Y.
(•RADAR TRANSMITTERS, •RADIO TRANSMITTERS, MICROWAVE FREQUENCY, •RADIOFREQUENCY POWER, MEASUREMENT BY •WAVEMETERS, •MICROWAVE PROBES IN •WAVEGUIDES, ANTENNA HORNS.) (•ELECTROMAGNETIC WAVES, TEST EQUIPMENT, WAVE CHARACTERISTICS, •MICROWAVES, ELECTRIC FIELDS, TRANSMISSION LINES, TESTS, MATHEMATICAL ANALYSIS.)

AD-273 415 62-2-5 DIV. 8
ELECTRICAL ENGINEERING RESEARCH LAB., U. OF ILLINOIS, URBANA.
(•RADIOFREQUENCY GENERATORS, •MICROWAVES, •ELECTROMAGNETIC WAVES, MICROWAVE FREQUENCY, WAVE TRANSMISSION.) (ELECTRON BEAMS, •FREQUENCY MULTIPLIERS, FREQUENCY SHIFT, •CEREMKOV RADIATION, •BREMSSTRAHLUNG.) ELECTRONS, PLASMA PHYSICS, DIELECTRICS, •WAVEGUIDES.

•ELECTRON BEAMS

AD-273 077 62-2-5 DIV. 8
ELECTRON PHYSICS LAB., U. OF MICHIGAN, ANN ARBOR.
(•ELECTRON GUNS, ELECTROMAGNETIC FIELDS, MICROWAVES.) (•ELECTRON BEAMS, NOISE (RADIO), SPACE CHARGES, MATHEMATICAL ANALYSIS, NUMERICAL METHODS AND PROCEDURES.) (•MICROWAVE AMPLIFIERS, S BAND, TESTS, MEASUREMENT.) (ELECTRONS, DENSITY, PROPAGATION.) NONLINEAR SYSTEMS, NOISE ANALYZERS.

AD-273 101 62-2-5 DIV. 8
CENTRE DE PHYSIQUE ELECTRONIQUE ET COMPUSCULAIRE (FRANCE).
(•ELECTRON GUNS, •ELECTRON BEAMS, •OPTICAL SYSTEMS, •MAGNETIC FIELDS, NOISE (RADIO), MEASUREMENT, TESTS, TEST EQUIPMENT, THEORY, FRANCE.) MAGNETRONS, CATHODES (ELECTRON TUBES), TEMPERATURE, ELECTRONS, ELECTRODES, ELECTRIC CURRENT, IMPEDANCE, VOLTMETERS, OSCILLOSCOPES, DIODES, SPACE CHARGES.

AD-273 181 62-2-5 DIV. 25
CENTRE DE PHYSIQUE ELECTRONIQUE ET COMPUSCULAIRE (FRANCE).
(•INFRARED RADIATION, •ELECTRON BEAMS FROM ELECTRON GUNS, TESTS.) (FEASIBILITY STUDIES, •BACKWARD-WAVE OSCILLATORS, •WAVEFORM GENERATORS, DESIGN.) PHOTOGRAPHIC ANALYSIS.

AD-273 267 62-2-5 DIV. 25
•PLASMA PHYSICS, MAGNETIC FIELDS.) (VELOCITY
REPUBLIC AVIATION CORP., FARMINGDALE, N. Y.
(•ELECTRON BEAMS, MODULATION, AND MOTION, EQUATIONS.) (PARTIAL DIFFERENTIAL EQUATIONS, BESSEL FUNCTIONS, PERTURBATON THEORY.)

•ELECTRON GUNS

AD-273 077 62-2-5 DIV. 8
ELECTRON PHYSICS LAB., U. OF MICHIGAN, ANN ARBOR.
(•ELECTRON GUNS, ELECTROMAGNETIC FIELDS, MICROWAVES.) (•ELECTRON BEAMS, NOISE (RADIO), SPACE CHARGES, MATHEMATICAL ANALYSIS, NUMERICAL METHODS AND PROCEDURES.) (•MICROWAVE AMPLIFIERS, S BAND, TESTS, MEASUREMENT.) (ELECTRONS, DENSITY, PROPAGATION.) NONLINEAR SYSTEMS, NOISE ANALYZERS.

AD-273 101 62-2-5 DIV. 8
CENTRE DE PHYSIQUE ELECTRONIQUE ET COMPUSCULAIRE (FRANCE).
(•ELECTRON GUNS, •ELECTRON BEAMS, •OPTICAL SYSTEMS, •MAGNETIC FIELDS, NOISE (RADIO), MEASUREMENT, TESTS, TEST EQUIPMENT, THEORY, FRANCE.) MAGNETRONS, CATHODES (ELECTRON TUBES), TEMPERATURE, ELECTRONS, ELECTRODES, ELECTRIC CURRENT, IMPEDANCE, VOLTMETERS, OSCILLOSCOPES, DIODES, SPACE CHARGES.

•ELECTRON TRANSITIONS

AD-273 102 62-2-5 DIV. 25
CONNELL AERONAUTICAL LAB., INC., BUFFALO, N. Y.
(•AERODYNAMIC HEATING, SHOCK WAVES, GASES, •NITROGEN, INFRARED SPECTROSCOPY, •ELECTRON TRANSITIONS, THEORY, QUANTUM MECHANICS.) (HIGH TEMPERATURE RESEARCH, AIR, SPECTROGRAPHIC ANALYSIS, RE-ENTRY AERODYNAMICS.)

AD-273 266 62-2-5 DIV. 4
RIAS, INC., BALTIMORE, MD.
(•BORON COMPOUNDS, HYDRIDES, •ORGANOBORANES, •COMPLEX COMPOUNDS, PYRIDINES, •ELECTRON TRANSITIONS, ATOMIC ENERGY LEVELS, QUANTUM MECHANICS.) METALORGANIC COMPOUNDS.

•ELECTRON TUBES

AD-273 170 62-2-5 DIV. 8
GENERAL ELECTRIC CO., •WAYNESBURO, KY.
(•ELECTRONIC CIRCUITS, HIGH TEMPERATURE RESEARCH, THERMIONIC EMISSION, RADIATION DAMAGE.) (CIRCUITS, •ELECTRON TUBES, •DIODES, TRIODES, ELECTRICAL PROPERTIES, MECHANICAL PROPERTIES, PROCESSING, MATERIALS, SHOCK RESISTANCE, LIFE EXPECTANCY, TITANIUM.) (•RESISTORS, •CARBON RESISTORS, MATERIALS, TUNGSTEN, MOLYBDENUM, LIFE EXPECTANCY.) (•CAPACITORS, MATERIALS, DIELECTRICS, CERAMIC MATERIALS, •VARIABLE CAPACITORS, •MICA CAPACITORS.) TEST EQUIPMENT.

AD-273 171 62-2-5 DIV. 8
GENERAL ELECTRIC CO., •WAYNESBURO, KY.
(•THIN FILMS, •ELECTRON TUBES,

ANALYSIS.) (FILMS• •SPECTROGRAPHIC ANALYSIS• OPTICAL ANALYSIS• X-RAY SPECTROSCOPY• MASS SPECTROSCOPY• THEORY.) (DIODES• TRIODES• TESTS• LIFE EXPECTANCY.)

•ELECTRONIC CIRCUITS

AD-273 170 62-2-5 DIV. 6
GENERAL ELECTRIC CO.• CINCINNATI• OHIO.
(•ELECTRONIC CIRCUITS• HIGH TEMPERATURE RESEARCH• THERMIONIC EMISSION• RADIATION DAMAGE.) (CIRCUITS• •ELECTRON TUBES• DIODES• TRIODES• ELECTRICAL PROPERTIES• MECHANICAL PROPERTIES• PROCESSING• MATERIALS• SHOCK RESISTANCE• LIFE EXPECTANCY• TITANIUM.) (•RESISTORS• •CARBON RESISTORS• MATERIALS• TUNGSTEN• MOLYBDENUM• LIFE EXPECTANCY.) (•CAPACITORS• MATERIALS• DIELECTRICS• CERAMIC MATERIALS• •VARIABLE CAPACITORS• •MICA CAPACITORS.) TEST EQUIPMENT.

•ELECTRONICS

AD-273 075 62-2-5 DIV. 8
RESEARCH LAB. OF ELECTRONICS• MASS. INST. OF TECH.• CAMBRIDGE.
(•ELECTRONICS• X-RAY SPECTROSCOPY• PHYSICAL CHEMISTRY• THERMODYNAMICS• MICROWAVE SPECTROSCOPY• MASERS• NUCLEAR MAGNETIC RESONANCE• MICROWAVES• MOLECULAR BEAMS• RADIO ASTRONOMY• •PLASMA PHYSICS• MAGNETOHYDRODYNAMICS• •COMMUNICATIONS THEORY• LANGUAGES• NEUROLOGY• SPEECH.)

•ELECTRONS

AD-273 026 62-2-5 DIV. 20
ARMOUR RESEARCH FOUNDATION• CHICAGO• ILL.
(•ELECTRONS• •ENERGY• •RADIATON EFFECTS• •FOOD• CARBOHYDRATES• SKIN.) (•GAMMA RAYS• DOSAGE• COMPTON SCATTERING• THEORY.)

AD-273 228 62-2-5 DIV. 25
ALLISON DIV.• GENERAL MOTORS CORP.• INDIANAPOLIS• IND.
(•KINETIC THEORY OF GASES• •CESIUM• GAS FLOW THROUGH CAPILLARY TUBES FOR •THERMIONIC EMISSION OF •IONS• •ELECTRONS• PLASMA PHYSICS.) (TUNGSTEN• MOLYBDENUM• TANTALUM.) (INTEGRAL EQUATIONS• DIFFERENTIAL EQUATIONS• MATRIX ALGEBRA• NUMERICAL ANALYSIS• GREEN'S FUNCTION•.) INSTRUMENTATION.

•ENERGY

AD-273 026 62-2-5 DIV. 20
ARMOUR RESEARCH FOUNDATION• CHICAGO• ILL.
(•ELECTRONS• •ENERGY• •RADIATON EFFECTS• •FOOD• CARBOHYDRATES• SKIN.) (•GAMMA RAYS• DOSAGE• COMPTON SCATTERING• THEORY.)

•EPOXY RESINS

AD-273 163 62-2-5 DIV. 14
•WESTINGHOUSE ELECTRIC CORP.• EAST PITTSBURGH• PA.
(•FILAMENT WOUND CONSTRUCTION• •EPOXY RESINS• POLYMERIZATION (SHRINKAGE)• •REINFORCING MATERIALS• •GLASS• PROCESSING.) (TESTS• HYDROSTATIC PRESSURE• TENSILE PROPERTIES• ELASTICITY• STRESSES• PHYSICAL PROPERTIES.)

ERRORS

AD-273 403 62-2-5 DIV. 30
FOREIGN TECH. DIV.• AIR FORCE SYSTEMS COMMAND •WRIGHT-PATTERSON AIR FORCE BASE• OHIO.
(•CODING• SEQUENCES• PROBABILTY• •ERRORS• •INFORMATION THEORY• INEQUALITIES.) (RADIO SIGNALS• TRANSMISSION• •DATA TRANSMISSION SYSTEMS• NOISE (RADIO)•.) USSR.

•ETHYL RADICALS

AD-273 126 62-2-5 DIV. 4
PELTMAN RESEARCH LABS.• PICATINNY ARSENAL• DOVER• N. J.
(SYNTHESIS OF •CATALYSTS• METALORGANIC COMPOUNDS AND SALTS OF •ALUMINUM COMPOUNDS AND •ETHYL RADICALS• •TITANIUM COMPOUNDS AND •HALIDES• •COMPLEX COMPOUNDS.) (CATALYSIS• POLYMERIZATION• STEREOCHEMISTRY• MOLECULAR ISOMERISM.)

•EXHAUST FLAMES

AD-273 435 62-2-5 DIV. 12
BOLING CO.• SEATTLE• WASH.
(•ROCKET MOTORS• •EXHAUST GASES• •EXHAUST FLAMES• DETECTION• •WIND TUNNELS• •TESTS• INFRARED RADIATION• SPECTROGRAPHIC ANALYSIS• MEASUREMENT.) (ALTITUDE CHAMBERS• SIMULATION.) (INSTRUMENTATION• RADIOMETERS SPECTROPHOTOMETERS.) (EXPERIMENTAL DATA• TABLES.) (LIQUID ROCKET PROPELLANTS• SOLID ROCKET PROPELLANTS.)

•EXHAUST GASES

AD-273 200 62-2-5 DIV. 9
ARNOLD ENGINEERING DEVELOPMENT CENTER• ARNOLD AIR FORCE STATION• TENN.
(ROCKETS• •EXHAUST GASES• NITROGEN• •ADSORPTION• ACTIVATED CARBON• VACUUM APPARATUS.) CRYOGENICS.

AD-273 293 62-2-5 DIV. 9
ARNOLD ENGINEERING DEVELOPMENT CENTER• ARNOLD AIR FORCE STATION• TENN.
(•SUPERSONIC DIFFUSERS• •SUPERSONIC WIND TUNNELS• ROCKETS• •EXHAUST GASES• TESTS• THEORY.) (NITRIC ACID• •ETHYL HYDRAZINES.) MACH NUMBER.

AD-273 346 62-2-5 DIV. 27
BENDIX SYSTEMS DIV.• BENDIX CORP.• ANN ARBOR• MICH.
(•PARTICLES IN ROCKET MOTOR NOZZLES• •EXHAUST GASES• •THERMAL RADIATION• TEMPERATURE• MATHEMATICAL ANALYSIS• EQUATIONS OF MOTION.) (ROCKET MOTORS• ROCKET FUELS• CESIUM COMPOUNDS• NITRATES• ALUMINUM.)

AD-273 435 62-2-5 DIV. 12
BOLING CO.• SEATTLE• WASH.
(•ROCKET MOTORS• •EXHAUST GASES• •EXHAUST FLAMES• DETECTION• •WIND TUNNELS• •TESTS• INFRARED RADIATION• SPECTROGRAPHIC ANALYSIS• MEASUREMENT.) (ALTITUDE CHAMBERS• SIMULATION.) (INSTRUMENTATION• RADIOMETERS SPECTROPHOTOMETERS.) (EXPERIMENTAL DATA• TABLES.) (LIQUID ROCKET PROPELLANTS• SOLID ROCKET PROPELLANTS.)

•EXPLOSIONS

AD-273 277 62-2-5 DIV. 22
DAVIDSON LAB.• STEVENS INST. OF TECH.• HOBOKEN, N. J.
(•EXPLOSIVES• CESIUM COMPOUND• ADDITIVES• •EXPLOSIONS• ELECTRICAL CONDUCTANCE. RESISTANCE• ELECTRICAL PROPERTIES• MEASUREMENT.) (•SHAPED CHARGES• PENETRATION• COPPER• TARGETS• SPECTROGRAPHIC ANALYSIS• PHOTOGRAPHIC ANALYSIS.) (•CAPACITORS• DESIGN• TESTS.)

•EXPLOSIVE ACTUATORS

AD-273 019 62-2-5 DIV. 22
FRANKFORD ARSENAL• PHILADELPHIA• PA.
(•EXPLOSIVE ACTUATORS• •SYMPOSIA.) (EXPLOSIVE ACTUATORS RELATED TO EJECTION SEATS• JETTISONABLE COCKPITS• CATAPULTS• SPACE CAPSULES• GAS GENERATING SYSTEMS• PRIMERS• CONTROL SYSTEMS• PROPELLANTS• HIGH TEMPERATURE RESEARCH• AGING• DETERIORATION• RELIABILITY• EJECTION.) (PROPELLANTS• QUALITY CONTROL• PRODUCTION.) (BOMBS• PARACHUTES.) (ELECTRONIC RELAYS• TIME DELAY RELAYS• TIMING CIRCUITS.) (EXPLODING CABLES• ELECTRIC DETONATORS.)

•EXPLOSIVES

AD-273 206 62-2-5 DIV. 22
BALLISTIC RESEARCH LABS.• ABERDEEN PROVING GROUND• MD.
(•HYDRODYNAMICS• THEORY OF DETONATION.) (•PENTOLITE• DETONATION• VELOCITY• PRESSURE.) (DETONATION WAVES• THERMODYNAMICS• EQUATIONS OF STATE.) (•EXPLOSIVES• DETONATION• MATHEMATICAL ANALYSIS.) (GASES• SOLIDS• ENTROPY.)

AD-273 277 62-2-5 DIV. 22
DAVIDSON LAB.• STEVENS INST. OF TECH.• HOBOKEN, N. J.
(•EXPLOSIVES• CESIUM COMPOUND• ADDITIVES• •EXPLOSIONS• ELECTRICAL CONDUCTANCE. RESISTANCE• ELECTRICAL PROPERTIES• MEASUREMENT.) (•SHAPED CHARGES• PENETRATION• COPPER• TARGETS• SPECTROGRAPHIC ANALYSIS• PHOTOGRAPHIC ANALYSIS.) (•CAPACITORS• DESIGN• TESTS.)

•EXTRUSION

AD-273 057 62-2-5 DIV. 26
ALLEGHENY LUDLUM STEEL CORP.• BRACKENRIDGE• PA.
(•EXTRUSION• FORGING• •MOLYBDENUM ALLOYS (TZM)• TITANIUM ALLOYS• ZIRCONIUM ALLOYS.) (SURFACE PROPERTIES• MICROSTRUCTURE• HARDNESS• TENSILE PROPERTIES.) (METAL FORMING PRESSES• HEATING• DIES• COATINGS• FLAME SPRAYING• ZIRCONIUM COMPOUNDS• OXIDES• LUBRICATION.)

AD-273 191 62-2-5 DIV. 26
ALLEGHENY LUDLUM STEEL CORP.• BRACKENRIDGE• PA.
(•EXTRUSION• FORGING• •MOLYBDENUM ALLOYS (TZM)• TITANIUM ALLOYS• ZIRCONIUM ALLOYS.) (SURFACE PROPERTIES• MICROSTRUCTURE• CRYSTAL STRUCTURE.) (METAL FORMING PRESSES• •DIES• COATINGS• LUBRICATION• DESIGN• HEAT TREATMENT.)

***FAILURE (MECHANICS)**

AD-273 137 62-2-5 DIV. 14
AEROELASTIC AND STRUCTURES RESEARCH LAB., MASS. INST. OF TECH., CAMBRIDGE.
(*SHEETS, METAL PLATES, *GLASS TEXTILES, LAMINATES, *SANDWICH PANELS, *ALUMINUM ALLOYS, FOILS, *STRESSES, LOADING, *FAILURE (MECHANICS), THEORY, MATHEMATICAL ANALYSIS, PROGRAMMING.) (RADOMES, STRUCTURES.) (TEST METHODS, HIGH PRESSURE RESEARCH, HYDROSTATIC PRESSURE, SHOCK WAVES, TEST EQUIPMENT, SHOCK TUBES.)

AD-273 286 62-2-5 DIV. 7
ARINC RESEARCH CORP., WASHINGTON, D. C.
(*ELECTRICAL EQUIPMENT, MILITARY EQUIPMENT, *RELIABILITY, MATHEMATICAL PREDICTION.) (*ELECTRIC MOTORS, ALTERNATING CURRENT, DIRECT CURRENT, SYNCHRO RECEIVERS, *MOTOR GENERATORS, *SERVO MOTORS, *SYNCHROS, *FAILURE (MECHANICS), AIRBORNE, SHIPBORNE, BEARINGS, LUBRICATION, BRUSHES, ANALYSIS.)

***FEASIBILITY STUDIES**

AD-273 158 62-2-5 DIV. 20
STANFORD RESEARCH INST., MENLO PARK, CALIF.
(*FEASIBILITY STUDIES ON *SIMULATION OF *GROUND EFFECT, MOTION FROM SURFACES OR UNDERGROUND EXPLOSIONS, *NUCLEAR EXPLOSIONS USING NON NUCLEAR EXPLOSIVES.) (GASES, DETONATION, SHOCK WAVES.)

AD-273 262 62-2-5 DIV. 6
TRACERLAB, INC., WALTHAM, MASS.
(*FEASIBILITY STUDY, *PROPELLANTS, *DETECTION IN THE ATMOSPHERE BY *RADIOACTIVATION ANALYSIS.) (GASES, *RADIOACTIVE ISOTOPES, KRYPTON, OXIDATION-REDUCTION REACTIONS.)

***FEEDBACK**

AD-273 024 62-2-5 DIV. 30
MICROWAVE RESEARCH INST., POLYTECHNIC INST. OF BROOKLYN, N. Y.
(*FEEDBACK, *SENSITIVITY, FUNCTIONS, SIGNAL-TO-NOISE RATIO, *ERRORS.) (*MATHEMATICAL LOGIC, *CONTROL SYSTEMS, RELIABILITY, DESIGN.) (NONLINEAR SYSTEMS, COMMUTATORS, EXPERIMENTAL DATA, TABLES.)

***FERRITES**

AD-273 003 62-2-5 DIV. 25
MICROWAVE LAB., STANFORD U., CALIF.
(FEASIBILITY STUDIES OF *WAVE FORM GENERATORS, *MICROWAVES, MAGNETIC FIELDS, RESONANCE ABSORPTION, SOLID STATE PHYSICS.) (ELECTROMAGNETIC WAVES, SHOCK WAVES IN *FERROMAGNETIC MATERIALS, SINGLE CRYSTALS, *FERRITES, DIELECTRICS.) (PARTIAL DIFFERENTIAL EQUATIONS, HARMONIC ANALYSIS, PERTURBATION THEORY.) X-RAY DIFFRACTION ANALYSIS.

***FILAMENT WOUND CONSTRUCTION**

AD-273 163 62-2-5 DIV. 14
WESTINGHOUSE ELECTRIC CORP., EAST PITTSBURGH, PA.
(*FILAMENT WOUND CONSTRUCTION, *EPOXY RESINS, POLYMERIZATION (SHRINKAGE), *REINFORCING MATERIALS, *GLASS, PROCESSING.) (TESTS, HYDROSTATIC PRESSURE, TENSILE PROPERTIES, ELASTICITY, STRESSES, PHYSICAL PROPERTIES.)

***FILM COOLING**

AD-273 333 62-2-5 DIV. 27
UNITED NUCLEAR CORP., WHITE PLAINS, N. Y.
(*ROCKET MOTOR NOZZLES, SOLID ROCKET PROPELLANTS, COOLING, *HEAT COOLING AND *FILM COOLING WITH GASES AND LIQUIDS, DESIGN, TESTS, MATHEMATICAL ANALYSIS, MANUFACTURING METHODS.) (COOLANTS, PHYSICAL PROPERTIES, HANDLING, STORAGE.) (MATERIALS, METALS, REFRACTORY MATERIALS, PHYSICAL PROPERTIES.) (TURBULENT BOUNDARY LAYER, HEAT TRANSFER, MATHEMATICAL ANALYSIS, TESTS.)

***FIRE RESISTANT TEXTILES**

AD-273 035 62-2-5 DIV. 14
NONMETALLIC MATERIALS LAB., AERONAUTICAL SYSTEMS DIV., WRIGHT-PATTERSON AIR FORCE BASE, OHIO.
(*PARACHUTES, PARACHUTE FABRICS, PROTECTIVE COVERINGS, *FIRE RESISTANT TEXTILES, SYNTHETIC FIBERS, HEAT RESISTANT POLYMERS, EFFECTIVENESS.) (TESTS, TEST METHODS, AIRCRAFT FIRES, SIMULATION.)

***FIRING ERROR INDICATORS**

AD-273 193 62-2-5 DIV. 22
AIR FORCE PROVING GROUND COMMAND, EGLIN AIR FORCE BASE, FLA.
(*AIRCRAFT FIRE CONTROL SYSTEMS, *FIRING ERROR INDICATORS, EFFECTIVENESS, RELIABILITY, TESTS.) (AERIAL TARGETS, TARGET DRONES, FIRING ERROR INDICATORS, AIRCRAFT AMMUNITION, *ROCKETS.) (FIRING ERROR INDICATORS, GAMMA RAYS, RADIOACTIVE ISOTOPES, RADIATION HAZARDS.) (PILOTS, *RADIATION HAZARDS.) (*PROJECTILES, RADIOACTIVITY, ROCKET TARGETS, TRACKING.)

***FLAMES**

AD-273 069 62-2-5 DIV. 25
INSTITUTO NACIONAL DE TECNICA AERONAUTICA (SPAIN).
(*LAMINAR BOUNDARY LAYER, *FLAMES, *DIFFUSION, SPECIFIC HEAT, CONDUCTIVITY, CHEMICAL REACTIONS, KINETIC THEORY, FUELS, OXIDIZERS.) (DIFFERENTIAL EQUATIONS, INTEGRAL EQUATIONS, GREEN'S FUNCTION, POLYNOMIALS.) STRUCTURES OF FLAMES.

***FLIGHT INSTRUMENTS**

AD-273 446 62-2-5 DIV. 1
MARTIN CO., BALTIMORE, MD.
(*FLIGHT INSTRUMENTS, CONTROL PANELS, INSTRUMENT PANELS, INSTRUMENT DIALS *DISPLAY SYSTEMS, NUMBERS, CODING, DESIGN, EFFECTIVENESS, PILOTS, READING, HUMAN ENGINEERING, STATISTICAL TESTS.) (STATISTICAL ANALYSIS, SAMPLING, PUBLIC OPINION POLLS.) ALL-WEATHER AVIATION, INSTRUMENT LANDINGS.

***FLIGHT PATHS**

AD-273 134 62-2-5 DIV. 12
LINCOLN LAB., MASS. INST. OF TECH., LEXINGTON.
(*GUIDED MISSILES, *FLIGHT PATHS, ANALYSIS, AERODYNAMICS, EARTH, GRAVITY.) (VELOCITY AND ACCELERATION OF *SATELLITE VEHICLES.) (HEAT TRANSFER, TURBULENCE, BOUNDARY LAYER.) (EQUATIONS OF MOTION, TRANSFORMATIONS (MATHEMATICS), DIGITAL COMPUTERS, EXPERIMENTAL DATA.)

***FLIGHT SIMULATORS**

AD-273 144 62-2-5 DIV. 1
NATIONAL AVIATION FACILITIES EXPERIMENTAL CENTER, ATLANTIC CITY, N. J.
(DESCRIPTORS) *AIRPLANE LANDINGS, *VOICE COMMUNICATION SYSTEMS, *AIR TRAFFIC CONTROL SYSTEMS, *AUTOMATIC NAVIGATORS, *FLIGHT SIMULATORS, HEIGHT FINDING, DIRECTION FINDING, DETECTION, DISPLAY SYSTEMS, GLIDE PATH SYSTEMS, APPROACH LIGHTS, RUNWAYS, GROUND SPEED INDICATORS, RADIO COMMUNICATION SYSTEMS, PARAMETRIC AMPLIFIERS, *DATA PROCESSING SYSTEMS, DISPLAY SYSTEMS, RADAR EQUIPMENT, *SAFETY, SIMULATION, THEORY, GROUND CONTROLLED RADAR, DOPPLER SYSTEMS, ANTENNAS, DIRECTION FINDING.

***FLUID FLOW**

AD-273 406 62-2-5 DIV. 9
FOREIGN TECH. DIV., AIR FORCE SYSTEMS COMMAND, WRIGHT-PATTERSON AIR FORCE BASE, OHIO.
(AERODYNAMICS, *FLUID FLOW, GAS TURBINES, *GUIDE VANES, PITCH.) MATHEMATICAL ANALYSIS, USSR.

***FLUID MECHANICS**

AD-273 247 62-2-5 DIV. 25
MATHEMATICS RESEARCH CENTER, U. OF WISCONSIN, MADISON.
(*SHOCK WAVES, FLUID FLOW, *MAGNETOHYDRODYNAMICS, PARTICLES, MAGNETIC FIELDS.) (COMPRESSIBLE FLOW, GAS IONIZATION, *FLUID MECHANICS, ACOUSTICS.) (*PERTURBATION THEORY, PARTIAL DIFFERENTIAL EQUATIONS.)

***FLUORIDES**

AD-273 048 62-2-5 DIV. 4
AEROSPACE CORP., LOS ANGELES, CALIF.
(*FLUORIDES OR *OXYFLUORIDES *SULFUR COMPOUNDS, *SELENIUM COMPOUNDS, *TELLURIUM COMPOUNDS, SYNTHESIS, CHEMICAL REACTIONS, PHYSICAL PROPERTIES, THERMODYNAMICS, HEAT OF FORMATION.)

AD-273 425 62-2-5 DIV. 14
MATERIALS RESEARCH LAB., U. OF CALIF., BERKELEY.
(*LITHIUM COMPOUNDS, *FLUORIDES, IONS, *CRYSTALS, *SINGLE CRYSTALS, CRYSTAL STRUCTURE, LATTICES.) (TESTS, MECHANICAL PROPERTIES, DEFORMATION, PLASTICITY, FRACTURE (MECHANICS), RUPTURE, FAILURE (MECHANICS), TENSILE PROPERTIES, BRITTLE MATERIALS.) GROWTH.

***FLUOROCARBONS**

AD-273 135 62-2-5 DIV. 14
LOCKHEED AIRCRAFT CORP., SUNNYVALE, CALIF.
(*BIBLIOGRAPHY, RADIATION EFFECTS.) *RADIATION DAMAGE, POLYMERS, FLUORIDES, ETHYLENES, PLASTICS, *FLUOROCARBONS.

***FLUTTER**

AD-273 326 62-2-5 DIV. 9
DAVIDSON LAB., STEVENS INST. OF TECH., HOBOKEN, N. J.
(*HYDROFOILS AND *AIRFOILS, *FLUTTER, VELOCITY AND FREQUENCY.) (ELASTICITY, STRESSES, *HYDRODYNAMICS, STABILITY, TESTS.) (LABORATORY EQUIPMENT, EXPERIMENTAL DATA, TABLES.)

***FLYING PLATFORMS**

AD-273 050 62-2-5 DIV. 1
PRINCETON U., N. J.
(*MILITARY AIRCRAFT, *MILITARY RESEARCH, *SCIENTIFIC RESEARCH, RESEARCH PROGRAM ADMINISTRATION.) (*VERTICAL TAKE-OFF PLANES, SHORT TAKE-OFF PLANES, *FLYING PLATFORMS, HELICOPTERS, GROUND EFFECT, STABILITY, CONTROL, MODEL TESTS, THEORY, MATHEMATICAL ANALYSIS.) (AIRCRAFT, AIRPLANES, ELECTRICAL PROPERTIES, THEORY.) (TEST FACILITIES, WIND TUNNELS, DESIGN.) *BIBLIOGRAPHY.

AD-273 051 62-2-5 DIV. 9
PRINCETON U., N. J.
(*FLYING PLATFORMS, GROUND EFFECT, AERODYNAMICS, MODEL TESTS, WIND TUNNEL MODELS, LIFT, DRAG, STABILITY, STABILITY (LONGITUDINAL), THRUST, VORTICES, LOADING.)

***FOOD**

AD-273 026 62-2-5 DIV. 30
ARMOUR RESEARCH FOUNDATION, CHICAGO, ILL.
(*ELECTRONS, *ENERGY, *RADIATON EFFECTS, *FOOD, CARBOHYDRATES, SKIN.) (*GAMMA RAYS, DOSAGE, COMPTON SCATTERING, THEORY.)

***FORGING**

AD-273 052 62-2-5 DIV. 26
WESTERN GEAR CORP., LYNWOOD, CALIF.
(*FORGING, ALLOYS, *HEAT RESISTANT ALLOYS, *REFRACTORY MATERIALS, *STEEL, STAINLESS STEEL, *TOOL STEEL, *TITANIUM ALLOYS.) (TEMPERATURE, PRESSURE, DEFORMATION, HEAT TREATMENT.) (MICROSTRUCTURE, TENSILE PROPERTIES, MECHANICAL PROPERTIES.) INDUSTRIAL EQUIPMENT.

***FOURIER ANALYSIS**

AD-273 243 62-2-5 DIV. 8
LINCOLN LAB., MASS. INST. OF TECH., LEXINGTON.
(*COMMUNICATIONS THEORY, *STATISTICAL PROCESSES, *STATISTICAL FUNCTIONS, MATHEMATICAL ANALYSIS, TRANSFORMATIONS (MATHEMATICS), *FOURIER ANALYSIS, *SERIES.) (*RADIOMETERS, CALIBRATION, CIRCUITS, SIGNAL-TO-NOISE RATIO.)

***FRACTURE (MECHANICS)**

AD-273 292 62-2-5 DIV. 17
PASADENA.
DYNAMIC PROPERTIES LAB., CALIF. INST. OF TECH.
(*METALS, *FRACTURE (MECHANICS), ELASTICITY, PLASTICITY, *PLASTIC FLOW, DEFORMATION, GRAINS (METALLURGY).) (STEEL, ZINC, SINGLE CRYSTALS.) BRITTLE MATERIALS.

***FREQUENCY MULTIPLIERS**

AD-273 415 62-2-5 DIV. 8
ELECTRICAL ENGINEERING RESEARCH LAB., U. OF ILLINOIS, URBANA.
(*RADIOFREQUENCY GENERATORS, *MICROWAVES, *ELECTROMAGNETIC WAVES, MICROWAVE FREQUENCY, WAVE TRANSMISSION.) (ELECTRON BEAMS, *FREQUENCY MULTIPLIERS, FREQUENCY SHIFT, *CEREVKOV RADIATION, *BREMSSTRAHLUNG.) ELECTRONS, PLASMA PHYSICS, DIELECTRICS, *WAVEGUIDES.

***FUEL CELLS**

AD-273 049 62-2-5 DIV. 7
LOCKHEED AIRCRAFT CORP., SUNNYVALE, CALIF.
(*FUEL CELLS, *WET CELLS, *ELECTROLYTIC CELLS, ELECTRODES, *ANODES (ELECTROLYTIC CELL), *CATHODES (ELECTROLYTIC CELL), CATALYSTS, PLATINUM, *FUELS, *AMMONIA, ETHYLENES, *GLYCOLS, *UREA, ELECTROLYTES, POTASSIUM COMPOUNDS, HYDROXIDES, CARBONATES.)

AD-273 299 62-2-5 DIV. 7
FLORIDA U. ENGINEERING AND INDUSTRIAL EXPERIMENT STATION, GAINESVILLE.
(*FUEL CELLS, POWER SUPPLIES, *HYDROGEN COMPOUNDS, *OXYGEN, *BROMIDES, OXIDATION TO BROMINE, ELECTROLYTIC CELLS, CHEMICAL REACTIONS, CATALYSTS, NITROGEN COMPOUNDS, OXIDES, OXIDATION-REDUCTION REACTIONS.) CHEMICAL ANALYSIS.

***FUEL INJECTION**

AD-273 146 62-2-5 DIV. 20
PESCO PRODUCTS DIV., BORG-WARNER CORP., BEDFORD, MASS.
(FLUID MECHANICS, *LIQUID ROCKET PROPELLANTS, *HYPERSONIC, ISOTHERM, TURBULENCE (FLUID FLOW.) (*FUEL INJECTION, FUEL TANKS, DESIGN.)

***FUEL PUMPS**

AD-273 413 62-2-5 DIV. 9
FOREIGN TECH. DIV., AIR FORCE SYSTEMS COMMAND, WRIGHT-PATTERSON AIR FORCE BASE, OHIO.
(*FUEL PUMPS, *CENTRIFUGAL PUMPS, *HYDRAULIC PRESSURE PUMPS, VIBRATION, CAVITATION, TESTS, TEST METHODS, USSR, MEASUREMENT, MATHEMATICAL ANALYSIS.)

***FUELS**

AD-273 049 62-2-5 DIV. 7
LOCKHEED AIRCRAFT CORP., SUNNYVALE, CALIF.
(*FUEL CELLS, *WET CELLS, *ELECTROLYTIC CELLS, ELECTRODES, *ANODES (ELECTROLYTIC CELL), *CATHODES (ELECTROLYTIC CELL), CATALYSTS, PLATINUM, *FUELS, *AMMONIA, ETHYLENES, *GLYCOLS, *UREA, ELECTROLYTES, POTASSIUM COMPOUNDS, HYDROXIDES, CARBONATES.)

***FUNCTIONS**

AD-273 300 62-2-5 DIV. 30
GRUMMAN AIRCRAFT ENGINEERING CORP., BETHPAGE, N. Y.
((ABSTRACT) *THEORY OF EFFECTIVENESS OF (COMPUTABLE) *FUNCTIONS.) (*AUTOMATION, STATISTICAL ANALYSIS (DECISION THEORY), *MATHEMATICAL LOGIC, *METAMATHEMATICS, MATRIX ALGEBRA, ANALYSIS (RECURSIVE), (RECURSIVE FUNCTIONS) COMPUTERS.)

***GAMMA RAYS**

AD-273 026 62-2-5 DIV. 20
ARMOUR RESEARCH FOUNDATION, CHICAGO, ILL.
(*ELECTRONS, *ENERGY, *RADIATION EFFECTS, *FOOD, CARBOHYDRATES, SKIN.) (*GAMMA RAYS, DOSAGE, COMPTON SCATTERING, THEORY.)

***GAS BEARINGS**

AD-273 286 62-2-5 DIV. 9
MECHANICAL TECHNOLOGY INC., LATHAM, N. Y.
(*GAS BEARINGS, COMPRESSIBLE FLOW, *VISCOSITY, FLUID FLOW.) (PARTIAL DIFFERENTIAL EQUATIONS, PERTURBATION THEORY.) (BEARINGS, *LUBRICATION.)

***GAS DISCHARGES**

AD-273 248 62-2-5 DIV. 25
MINNESOTA U., MINNEAPOLIS.
(*GAS DISCHARGES, *NOISE, THEORY.) (*PLASMA PHYSICS, GAS IONIZATION, ELECTROMAGNETIC WAVES, LOW FREQUENCY, HIGH FREQUENCY, TEMPERATURE.) (TEST METHODS, TEST EQUIPMENT, DISCHARGE TUBES.)

AD-273 249 62-2-5 DIV. 25
MINNESOTA U., MINNEAPOLIS.
(*GAS DISCHARGES, NOISE, THEORY. (*ELECTROMAGNETIC WAVES, MEASUREMENT, *PLASMA PHYSICS, PREMSSTRAHLUNG, HIGH FREQUENCY, NEON WAVE TRANSMISSION.) (*GAS IONIZATION, ELECTRONS, ENERGY, IONS, *DISCHARGE TUBES.)

***GAS FLOW**

AD-273 278 62-2-5 DIV. 9
PRINCETON U., N. J.
(*GAS FLOW, OSCILLATION, *HEAT TRANSFER, *TURBULENT FLOW, DUCT INLETS, MACH NUMBER, PRESSURE, SHOCK WAVES.) (INSTRUMENTATION, HEATERS, ANEMOMETERS.)

***GAS IONIZATION**

AD-273 072 62-2-5 DIV. 25
LINCOLN LAB., MASS. INST. OF TECH., LEXINGTON.
(ATMOSPHERE ENTRY, RE-ENTRY VEHICLES, *PLASMA PHYSICS, *RE-ENTRY AERODYNAMICS, *MAGNETOHYDRODYNAMICS.) (*ELECTROMAGNETIC FIELDS, *GAS IONIZATION, ELECTRONS, DENSITY, MEASUREMENT IN TURBULENT FLOW, WAKE, SHOCK WAVES, ABLATION.) (WAVE TRANSMISSION, *REFLECTION, S BAND, ULTRA HIGH FREQUENCY, RADAR TRACKING, RADAR SIGNALS.) (TELEMETER SYSTEMS, DATA PROCESSING SYSTEMS, PROGRAMMING, DIGITAL COMPUTERS.) (INSTRUMENTATION, PHOTOGRAPHY, SCHLIEREN PHOTOGRAPHY.) OPTICAL TRACKING.

AD-273 249 62-2-5 DIV. 25
MINNESOTA U., MINNEAPOLIS.
(*GAS DISCHARGES, NOISE, THEORY.) (*ELECTROMAGNETIC WAVES, MEASUREMENT, *PLASMA PHYSICS, PREMSSTRAHLUNG, HIGH FREQUENCY, NEON WAVE TRANSMISSION.) (*GAS IONIZATION, ELECTRONS, ENERGY, IONS, *DISCHARGE TUBES.)

***GAS TURBINES**

AD-273 405 62-2-5 DIV. 9
FOREIGN TECH. DIV., AIR FORCE SYSTEMS COMMAND, WRIGHT-PATTERSON AIR FORCE BASE, OHIO.
(AERODYNAMICS, *FLUID FLOW, GAS TURBINES, *GUIDE VANES, PITCH.) MATHEMATICAL ANALYSIS, USSR.

***GAS VALVES**

AD-273 063 62-2-5 DIV. 20
FAIRBANK CO., GLENDALE, CALIF.
(*GAS VALVES, *CONTROL VALVES HYDRAULIC ACTUATORS, SPRINGS, DESIGN, TESTS (VIBRATION, TEMPERATURE, ACCELERATION,) (SAFETY VALVES, *PRESSURE REGULATORS, DESIGN TESTS.) (GUIDED MISSILES, SATELLITE VEHICLES.

AD-273 364 62-2-5 DIV. 20
FAIRBANK CO., GLENDALE, CALIF.
(*SAFETY VALVES, *PRESSURE REGULATORS, HYDRAULIC ACTUATORS, DESIGN, TESTS GUIDED MISSILES, SOLENOIDS, *CONTROL VALVES) (*GAS VALVES, SPECIFICATIONS, TEST METHODS.

***GENERATORS**

AD-273 336 62-2-5 DIV. 6
WESTINGHOUSE ELECTRIC CORP., BALTIMORE, MD.
(*PHOTOTUBES, *SOLAR CELLS, SOLAR ENERGY, *POWER TRANSFORMERS, *REFRACTORS DESIGN, PRODUCTION, MANUFACTURING METHODS.) (ELECTRON TUBES, CATHODES (ELECTRON TUBES), PHOTOSENSITIVITY, PHOTOEMISSION, ANODES (ELECTRON TUBES), GLASS, INSULATING MATERIALS, VACUUM SEALS, PROCESSING, CLEANING, TEST METHODS.)

***GEOCHEMISTRY**

AD-273 076 62-2-5 DIV. 2
MASSACHUSETTS INST. OF TECH., CAMBRIDGE.
(METEORITES, *MINERALS, *GEOCHEMISTRY, *ISOTOPES, RADIOACTIVE ISOTOPES, *STRONTIUM, *RUBIDIUM, AUSTRALIA, INDOCHINA INDONESIA, PHILIPPINE ISLANDS, NORTH AMERICA, CZECHOSLOVAKIA,) CHEMICAL ANALYSIS, MASS SPECTROSCOPY, X-RAY SPECTRUSCOPY, FLUORESCENCE.

***GEODESICS**

AD-273 197 62-2-5 DIV. 2
AERONAUTICAL CHART AND INFORMATION CENTER, ST. LOUIS, MO.
*GEODESICS.

***GEOGRAPHY**

AD-273 258 62-2-5 DIV. 2
NAVAL ORDNANCE TEST STATION, CHINA LAKE, CALIF.
(*OCEANOGRAPHY AND OCEAN BOTTOM ANALYSIS OF *BEACHES ALONG SOUTH CHINA SEA, EGYPT, TAIWAN, KOREA, IRAN, ARABIA, FINLAND AND USSR.) (*GEOGRAPHY, HISTORY, GEOLOGY AND METEOROLOGY.) (METEOROLOGICAL DATA, *OCEANOGRAPHICAL DATA AND *SEDIMENTATION.) ANTISUBMARINE *WARFARE.

***GEOMETRY**

AD-273 291 62-2-5 DIV. 25
BROWN U., PROVIDENCE, R. I.
(*OPTICS, *GEOMETRY, SCATTERING, LIGHT, DIFFRACTION, *REFLECTION, *WAVE TRANSMISSION IN *DIELECTRICS, CYLINDRICAL BODIES) (TAYLOR'S SERIES, WAVE ANALYSIS, FUNCTIONS.)

***GERMANIUM**

AD-273 138 62-2-5 DIV. 8
MOTOROLA, INC., PHOENIX, ARIZ.
(*TRANSISTORS, *DIELECTRICS, *GERMANIUM, *SILICON, *SEMICONDUCTORS, SURFACES, SURFACE PROPERTIES, DIELECTRIC PROPERTIES.) (PROCESSING, AGING, ENCAPSULATION, CONTROLLED ATMOSPHERES, CONTROL OF WATER VAPOR WITH BARIUM COMPOUNDS, OXIDES, NITROGEN, OXYGEN, HYDROGEN COMPOUNDS, BORON COMPOUNDS, DIOXIDES.) (OXIDATION, SILICON, SILICON COMPOUNDS, DIOXIDES, TEMPERATURE.)

***GERMANY**

AD-273 153 62-2-5 DIV. 30
TEXAS U., AUSTIN.
(*MACHINE TRANSLATION, LANGUAGE, *GERMANY.) PROBABILITY.

***GLASS**

AD-273 047 62-2-5 DIV. 14
FELTMAN RESEARCH LABS., PICATINNY ARSENAL, DOVER, N. J.
(*GLASS, PROCESSING, TENSILE PROPERTIES, *BRITTLE MATERIALS, SURFACE PROPERTIES,) (PICKLING, HEAT TREATMENT, PRESSURE, COOLING, DEGASIFICATION, RADIATION EFFECTS, GAMMA RAYS, ULTRASONICS, SOUND,) USSR.

AD-273 183 62-2-5 DIV. 14
WESTINGHOUSE ELECTRIC CORP., EAST PITTSBURGH, PA.
(*FILAMENT WOUND CONSTRUCTION, *EPOXY RESINS, POLYMERIZATION (CHEMICAL), *REINFORCING MATERIALS, *GLASS, PROCESSING,) (TESTS, HYDROSTATIC PRESSURE, TENSILE PROPERTIES, ELASTICITY, STRESSES, PHYSICAL PROPERTIES.)

***GLASS TEXTILES**

AD-273 045 62-2-5 DIV. 14
GENERAL DYNAMICS/ASTRONAUTICS, SAN DIEGO, CALIF.
(*ALLOYS, *METALS, *PLASTICS, LAMINATED PLASTICS, *GLASS TEXTILES, LAMINATES, SHEETS, METAL PLATES, TITANIUM, *TITANIUM ALLOYS, *ALUMINUM ALLOYS, *STAINLESS STEEL, *STEEL, *NICKEL ALLOYS,) (LOW TEMPERATURE RESEARCH, CRYOGENICS, MECHANICAL PROPERTIES, PHYSICAL PROPERTIES, FATIGUE (MECHANICS), CORROSION,) (MARTENSITE, X-RAY DIFFRACTION ANALYSIS,) (THERMAL EXPANSION, MEASUREMENT)

AD-273 137 62-2-5 DIV. 14
AEROELASTIC AND STRUCTURES RESEARCH LAB., MASS. INST. OF TECH., CAMBRIDGE.
(SHEETS, METAL PLATES, *GLASS TEXTILES, LAMINATES, *SANDWICH PANELS, *ALUMINUM ALLOYS, FOILS, *STRESSES, LOADING, *FAILURE (MECHANICS), THEORY, MATHEMATICAL ANALYSIS, PROGRAMMING,) (RADOMES, STRUCTURES,) (TEST METHODS, HIGH PRESSURE RESEARCH, HYDROSTATIC PRESSURE, SHOCK WAVES, TEST EQUIPMENT, SHOCK TUBES,)

AD-273 297 62-2-5 DIV. 27
DEFENSE METALS INFORMATION CENTER, COLUMBUS, OHIO.
(*ROCKET CASES, *MATERIALS, *STEEL, *TITANIUM ALLOYS, LAMINATES, FILAMENT WOUND CONSTRUCTION, GLASS TEXTILES, PLASTICS, EFFECTIVENESS, DESIGN,) (STRESSES, DEFORMATION, MECHANICAL PROPERTIES, PHYSICAL PROPERTIES, BUCKLING, ELASTICITY, DENSITY,)

***GLYCOLS**

AD-273 049 62-2-5 DIV. 7
LOCKHEED AIRCRAFT CORP., SUNNYVALE, CALIF.
(*FUEL CELLS, *WET CELLS, *ELECTROLYTIC CELLS, ELECTRODES, *ANODES (ELECTROLYTIC CELL), *CATHODES (ELECTROLYTIC CELL), CATALYSTS, PLATINUM, *FUELS, *AMMONIA, ETHYLENES, *GLYCOLS, *UREA, ELECTROLYTES, POTASSIUM COMPOUNDS, HYDROXIDES, CARBONATES.)

***GOGGLES**

AD-273 230 62-2-5 DIV. 16
INDIANA U., BLOOMINGTON.
(*VISION, *OPTICAL FILTERS, *GOGGLES, EFFECTIVENESS.) (OPHTHALMOLOGY, VISUAL THRESHOLDS, TARGET RECOGNITION.)

***GRAINS (METALLURGY)**

AD-273 436 62-2-5 DIV. 17
OKLAHOMA U. RESEARCH INST., NORMAN.
(METALS, METALLIC CRYSTALS, *GRAINS (METALLURGY), DIFFUSION, CHEMICAL IMPURITIES, LATTICES, *LEAD, TRACER STUDIES, CRYSTALS, AUTORADIOGRAPHY.)

***GRAVITY**

AD-273 234 62-2-5 DIV. 2
HAMBURG U. (GERMANY).
(*GRAVITY OF THE *EARTH.) (GEOLOGY, PHYSICS, OCEANOGRAPHY, ASTRONOMY,) (*RELATIVITY THEORY, QUANTUM MECHANICS, TRANSFORMATIONS (MATHEMATICS), PERTURBATION THEORY.)

***GREEN'S FUNCTION**

AD-273 054 62-2-5 DIV. 25
MICROWAVE RESEARCH INST., POLYTECHNIC INST. OF BROOKLYN, N. Y.
(*ELECTROMAGNETIC FIELDS, *PROPAGATION, ANALYSIS, *SYNTHESIS, *WAVEGUIDES,) (*SPHERES, *CYLINDRICAL BODIES, *GREEN'S FUNCTION, VECTOR ANALYSIS,) (*PHYSICS, PARTIAL DIFFERENTIAL EQUATIONS,) (COMPLEX VARIABLES, FUNCTIONS, TRANSFORMATIONS (MATHEMATICS), BESSEL FUNCTIONS, INTEGRAL EQUATIONS,)

***GROUND EFFECT**

AD-273 153 62-2-5 DIV. 20
STANFORD RESEARCH INST., MENLO PARK, CALIF.
(*FEASIBILITY STUDIES ON *SIMULATION OF *GROUND EFFECT, MOTION FROM SURFACES OR UNDERGROUND EXPLOSIONS, *NUCLEAR EXPLOSIONS USING NON NUCLEAR EXPLOSIVES,) (GASES, DETONATION, SHOCK WAVES,)

***GUIDE VANES**

AD-273 147 62-2-5 DIV. 27
PHILLIPS PETROLEUM CO., BARTLESVILLE, OKLA.
(*TURBOJET ENGINES, DUCT INLETS,

GUIDE VANES RELIABILITY* CORROSION* SULFUR* SEA WATER* TESTS.) (COMBUSTION CHAMBERS* COMBUSTION CHAMBER LINERS* CORROSION* EROSION* FLAMES* COMBUSTION CHAMBER GASES* TESTS.) (HYDROCARBONS* JET ENGINE FUELS* COMBUSTION* HIGH TEMPERATURE RESEARCH.) STAINLESS STEEL TEST EQUIPMENT.

AD-273 906 62-2-5 DIV. 9
FOREIGN TECH. DIV.* AIR FORCE SYSTEMS COMMAND* WRIGHT-PATTERSON AIR FORCE BASE* OHIO.
(AERODYNAMICS* *FLUID FLOW* GAS TURBINES* *GUIDE VANES* PITCH.) MATHEMATICAL ANALYSIS* USSR.

GUIDED MISSILE RESEARCH

AD-273 195 62-2-5 DIV. 12
AEROSPACE CORP.* LOS ANGELES* CALIF.
(*BIBLIOGRAPHY* *GUIDED MISSILES* GUIDED MISSILE RESEARCH* POWER SUPPLIES* PROPULSION* ELECTRONICS* RADIATION DAMAGE* ENERGY.) (MAINTENANCE* MANNED.)

GUIDED MISSILES

AD-273 134 62-2-5 DIV. 12

LINCOLN LAB.* MASS. INST. OF TECH.* LEXINGTON
(*GUIDED MISSILES* *FLIGHT PATHS* ANALYSIS* AERODYNAMICS* EARTH* GRAVITY.) (VELOCITY AND ACCELERATION OF *SATELLITE VEHICLES.) (HEAT TRANSFER* TURBULENCE* BOUNDARY LAYER.) (EQUATIONS OF MOTION* TRANSFORMATIONS (MATHEMATICS)* DIGITAL COMPUTERS* EXPERIMENTAL DATA.)

AD-273 150 62-2-5 DIV. 12
REED RESEARCH* INC.* WASHINGTON* D. C.
(PREPARATION OF STANDARDS AND SPECIFICATIONS FOR DESIGN OF *GUIDED MISSILES* SHIPPING AND STORAGE* *CONTAINERS.) (GUIDED MISSILES* PACKAGING* MILITARY REQUIREMENTS.) (STANDARDIZATION OF HANDBOOKS FOR DESIGN* GUIDED MISSILES* CONTAINERS.) (CONTAINERS* SHOCK* VIBRATION* MAINTENANCE* TEST METHODS*

AD-273 151 62-2-5 DIV. 12
REED RESEARCH INC.* WASHINGTON* D. C.
(DESIGN* STANDARDIZATION FOR *GUIDED MISSILES* SHIPPING* *CONTAINERS.) (PREPARATION OF *STANDARDS AND *SPECIFICATIONS FOR GUIDED MISSILES* CONTAINERS.) (CONTAINERS* TEST METHODS* TEST EQUIPMENT* TESTS* MILITARY REQUIREMENTS.) (SPECIFICATIONS FOR CORROSION HANDLING* VIBRATION* SHOCK RESISTANCE* TEST.)

AD-273 152 62-2-5 DIV. 12
REED RESEARCH* INC.* WASHINGTON* D. C.
(PREPARATION OF STANDARDS AND SPECIFICATIONS FOR DESIGN OF *GUIDED MISSILES SHIPPING AND STORAGE* *CONTAINERS.) (GUIDED MISSILES* *PACKAGING* MILITARY REQUIREMENTS.) (STANDARDIZATION OF HANDBOOKS FOR DESIGN OF GUIDED MISSILES* CONTAINERS.)

AD-273 195 62-2-5 DIV. 12
AEROSPACE CORP.* LOS ANGELES* CALIF.
(*BIBLIOGRAPHY* *GUIDED MISSILES* GUIDED MISSILE RESEARCH* POWER SUPPLIES* PROPULSION* ELECTRONICS* RADIATION DAMAGE* ENERGY.) (MAINTENANCE* MANNED.)

AD-273 241 62-2-5 DIV. 30
MELPAR* INC.* WATERTOWN* MASS.
(*STATISTICAL ANALYSIS* THEORY AS APPLIED TO DECISION THEORY* *GUIDED MISSILES* *IDENTIFICATION AND DISCRIMINATORS (DECTV).) (DIGITAL COMPUTERS* CODING* SIGNAL-TO-NOISE RATIO* COMMUNICATIONS THEORY* DIGITAL CONVERTERS* NUMERICAL METHODS AND PROCEDURES* MATRIX ALGEBRA* PROBABILITY* INTEGRAL EQUATIONS* TRANSFORMATIONS (MATHEMATICS).)

AD-273 334 62-2-5 DIV. 12
NORTHROP CORP.* HAWTHORNE* CALIF.
(*SATELLITE VEHICLES* *GUIDED MISSILES* *BOOSTER ROCKETS* DYNAMICS* *VIBRATION* FATIGUE (MECHANICS)* AIRFRAMES* STRUCTURES.) (VIBRATION FROM ROCKET MOTOR NOISE* EXHAUST GASES* TURBULENT BOUNDARY LAYER* OSCILLATION OF SHOCK WAVES* FLUTTER* TURBULENCE FROM ATMOSPHERE* *IND* METEORITES* COMBUSTION OF ROCKET MOTORS.) (VIBRATION* FATIGUE (MECHANICS)* MATHEMATICAL ANALYSIS* INTEGRAL EQUATIONS* ANALYSIS* TEST METHODS* EXPERIMENTAL DATA.) AERODYNAMICS* GROUND EFFECT.

AD-273 342 62-2-5 DIV. 25
AVCO RESEARCH LAB.* EVERETT* MASS.
(*HEAT TRANSFER IN LAMINAR BOUNDARY LAYER* *GUIDED MISSILES* AXIALLY SYMMETRIC FLOW.) (*INTEGRAL EQUATIONS* COMBINATORIAL ANALYSIS* LINEAR SYSTEMS.)

GYROSCOPES

AD-273 092 62-2-5 DIV. 19
SPERRY GYROSCOPE CO.* GREAT NECK* N. Y.
(*GYROSCOPES* GYRO STABILIZERS* BALL BEARINGS* GIMBALS* DESIGN* SENSITIVITY* DRIFT* TESTS.) INERTIAL GUIDANCE.

HALIDES

AD-273 126 62-2-5 DIV. 4
FELTMAN RESEARCH LABS.* PICATINNY ARSENAL* DOVER* N. J.
(SYNTHESIS OF *CATALYSTS* METAL-ORGANIC COMPOUNDS AND SALTS OF *ALUMINUM COMPOUNDS AND *ETHYL RADICALS* *TITANIUM COMPOUNDS AND *HALIDES* *COMPLEX COMPOUNDS.) (CATALYSIS* POLYMERIZATION* STEREOCHEMISTRY* MOLECULAR ISOMERISM.)

HANDBOOKS

AD-273 434 62-2-5 DIV. 26
ENGINEERING PSYCHOLOGY LAB.* U. OF PITTSBURGH* PA.
(*HANDBOOKS* *HUMAN ENGINEERING* *JOB ANALYSIS.) (*PERCEPTION* BEHAVIOR* MOTOR REACTIONS* PSYCHOMOTOR TESTS.) (CONTROL SYSTEMS* TRACKING* CODING* DISPLAY SYSTEMS* DESIGN* OPERATION* EFFECTIVENESS.)

HEAT EXCHANGERS

AD-273 244 62-2-5 DIV. 21
MARTIN CO.* BALTIMORE* MD.
(*NUCLEAR POWER PLANTS* *HEAT EXCHANGERS* MATERIALS* *CORROSION RESEARCH.) (NICKEL* NICKEL ALLOYS* COPPER ALLOYS* CHROMIUM ALLOYS* STAINLESS STEEL* STEEL* MOLYBDENUM ALLOYS.) (TESTS* MODEL TESTS* TEST METHODS* CORROSIVE LIQUIDS* STEAM* CHLORIDES.)

HEAT RESISTANT ALLOYS

AD-273 052 62-2-5 DIV. 26
ESTERN GEAR CORP. LYNWOOD* CALIF.
(*FORGING* ALLOYS* *HEAT RESISTANT ALLOYS* *REFRACTORY MATERIALS* *STEEL* STAINLESS STEEL* *TOOL STEEL* *TITANIUM ALLOYS.) (TEMPERATURE* PRESSURE* DEFORMATION* HEAT TREATMENT.) (MICROSTRUCTURE* TENSILE PROPERTIES* MECHANICAL PROPERTIES.) INDUSTRIAL EQUIPMENT.

AD-273 184 62-2-5 DIV. 17
DEFENSE METALS INFORMATION CENTER* COLUMBUS* OHIO.
(*BIBLIOGRAPHY* *HEAT RESISTANT ALLOYS* *METALS* *CERAMIC MATERIALS* *REFRACTORY MATERIALS* ALLOYS.) (STAINLESS STEEL* STEEL* IRON ALLOYS* NICKEL ALLOYS* BERYLLIUM* TITANIUM* MAGNESIUM* NIOBIUM* CHROMIUM* MOLYBDENUM* TANTALUM* VANADIUM* TUNGSTEN.) COATINGS.

AD-273 417 62-2-5 DIV. 17
GENERAL DYNAMICS/FORT WORTH* TEX.
(HIGH TEMPERATURE RESEARCH* ALLOYS* METALS.) (*HEAT RESISTANT ALLOYS FOR SUPERSONIC PLANES* SPACESHIPS* SATELLITE VEHICLES* MECHANICAL PROPERTIES* PHYSICAL PROPERTIES* CREEP* RUPTURE* COSTS.) IRON ALLOYS* COBALT ALLOYS* NICKEL ALLOYS* TITANIUM ALLOYS* BERYLLIUM ALLOYS.

HEAT TOLERANCE

AD-273 095 62-2-5 DIV. 15
AEROSPACE MEDICAL LAB.* AERONAUTICAL SYSTEMS DIV.* WRIGHT-PATTERSON AIR FORCE BASE* OHIO.
(*SKIN* BODY TEMPERATURE* MEASUREMENT* NUCLEAR EXPLOSIONS* SIMULATION.) (*HEAT TOLERANCE* MAN.)

HEAT TRANSFER

AD-273 089 62-2-5 DIV. 25
AERONAUTICAL ELECTRONIC AND ELECTRICAL LAB.* NAVAL AIR DEVELOPMENT CENTER* JOHNSVILLE* PA.
(*HEAT TRANSFER AND *THERMAL CONDUCTIVITY IN FINS AND METAL PLATES.) (COOLING* TEMPERATURE MEASUREMENT.) (DIFFERENTIAL EQUATIONS* INTEGRAL TRANSFORMS* PARTIAL DIFFERENTIAL EQUATIONS.)

AD-273 118 62-2-5 DIV. 25
ALLIED RESEARCH ASSOCIATES* INC.* BOSTON* MASS.
(*HEAT TRANSFER* *SOLIDS* SHEETS* *THERMAL CONDUCTIVITY.) (*INTEGRAL EQUATIONS* DIFFERENTIAL EQUATIONS* NUMERICAL ANALYSIS.)

AD-273 213 62-2-5 DIV. 14
CALIFORNIA U.* BERKELEY.
(*PLATING* *SHEETS* SURFACE TEMPERATURES* *HEAT TRANSFER.) (MATERIALS* HEAT SHIELDS OR SINK* THERMAL CONDUCTIVITY.) (GRAPHITE* TEMPERATURE MEASUREMENT* PHYSICAL PROPERTIES* HIGH TEMPERATURE RESEARCH.)

AD-273 274 62-2-5 DIV. 9
PRINCETON U.* N. J.
(*GAS FLOW* OSCILLATION* *HEAT TRANSFER* *TURBULENT FLOW* DUCT INLETS* MACH NUMBER* PRESSURE* SHOCK WAVES.) (INSTRUMENTATION* HEATERS* ANEMOMETERS.)

AD-273 302 62-2-5 DIV. 2
JOHANNES GUTENBERG-UNIVERSITAET (GERMANY).
(STATISTICAL ANALYSIS OF *HEAT TRANSFER FROM *OCEANS TO *AIR.) (METEOROLOGICAL DATA FROM WEATHER STATIONS ON SHIPS IN ATLANTIC OCEAN.)

AD-273 311 62-2-5 DIV. 9
N. J.
(*HEAT TRANSFER FROM *LAMINAR BOUNDARY LAYER TO *AERODYNAMIC CONFIGURATIONS* MEASUREMENT IN GASES AT SUPERSONIC FLOW AND HYPERSONIC FLOWS.) (WIND TUNNELS* MACH NUMBER* TESTS.)

AD-273 342 62-2-5 DIV. 25
AVCO RESEARCH LAB.* EVERETT* MASS.
(*HEAT TRANSFER IN LAMINAR BOUNDARY LAYER* *GUIDED MISSILES* AXIALLY SYMMETRIC FLOW.) (*INTEGRAL EQUATIONS* COMBINATORIAL ANALYSIS* LINEAR SYSTEMS.)

HEATING

AD-273 410 62-2-5 DIV. 17
FOREIGN TECH. DIV.* AIR FORCE SYSTEMS COMMAND* WRIGHT-PATTERSON AIR FORCE BASE* OHIO.
(*ALLOYS* *METALS* *HEATING IN *ELECTROLYTES BY ELECTRIC CURRENTS OR ELECTRIC POTENTIAL* TEXTBOOKS.) (INDUSTRIAL EQUIPMENT AUTOMATION* INDUSTRIAL PLANTS* USSR.) (HARDENING* SOLDERING* *BOLTING* METAL FORMING PRESSES.)

HELICOPTER ROTORS

AD-273 332 62-2-5 DIV. 9
SIKORSKY AIRCRAFT DIV.* UNITED AIRCRAFT CORP.* STRATFORD* CONN.
(*HELICOPTER ROTORS* *AERODYNAMICS* TRANSONICS* COMPRESSIBLE FLOW* MATHEMATICAL ANALYSIS* MODEL TESTS* WIND TUNNEL MODELS* VIBRATION* STRESSES* DEFORMATION* ELASTICITY* LIFT* DRAG* TORQUE* POWER* STALLING* THRUST.)

HUMAN ENGINEERING

AD-273 434 62-2-5 DIV. 26
ENGINEERING PSYCHOLOGY LAB.* U. OF PITTSBURGH* PA.
(*HANDBOOKS* *HUMAN ENGINEERING* *JOB ANALYSIS.) (*PERCEPTION* BEHAVIOR* MOTOR REACTIONS* PSYCHOMOTOR TESTS.) (CONTROL SYSTEMS* TRACKING* CODING* DISPLAY SYSTEMS* DESIGN* OPERATION* EFFECTIVENESS.)

HYDRAULIC FLUIDS

AD-273 081 62-2-5 DIV. 14
MONSANTO RESEARCH CORP.* EVERETT* MASS.
(*BIBLIOGRAPHY* *HYDRAULIC FLUIDS* LUBRICANTS* *ADDITIVES* HIGH TEMPERATURE RESEARCH.

HYDRAULIC PRESSURE PUMPS

AD-273 413 62-2-5 DIV. 9
FOREIGN TECH. DIV.* AIR FORCE SYSTEMS COMMAND* WRIGHT-PATTERSON AIR FORCE BASE* OHIO.
(*FUEL PUMPS* *CENTRIFUGAL PUMPS* *HYDRAULIC PRESSURE PUMPS* VIBRATION* CAVITATION* TESTS* TEST METHODS* USSR* MEASUREMENT* MATHEMATICAL ANALYSIS.)

HYDRAULIC SYSTEMS

AD-273 209 62-2-5 DIV. 1
CHANCE VOUGHT CORP.* DALLAS* TEX.
(*JET PLANES* *ROCKET PLANES* *HYPERVELOCITY VEHICLES* NAVAL AIRCRAFT* CONTROLSYSTEMS* SERVO SYSTEMS* HYDRAULIC SERVOMECHANISMS* *HYDRAULIC SYSTEMS* DESIGN* PACKAGING* HIGH TEMPERATURE RESEARCH* INSTALLATION.) (HYDRAULIC VALVES* HYDRAULIC SEALS* METAL SEALS* DESIGN* MATERIALS* PACKAGING* TESTS* TEST METHODS.)

AD-273 210 62-2-5 DIV. 1
CHANCE VOUGHT CORP.* DALLAS* TEX.
(*JET PLANES* *ROCKET PLANES* *HYPERVELOCITY VEHICLES* NAVAL AIRCRAFT* CONTROL SYSTEMS* SERVO SYSTEMS* HYDRAULIC SERVOMECHANISMS* *HYDRAULIC SYSTEMS* DESIGN* PACKAGING* HIGH TEMPERATURE RESEARCH* INSTALLATION.) (HYDRAULIC VALVES* PRESSURE SWITCHES* HYDRAULIC FLUID FILTERS* DESIGN* SPECIFICATIONS* STANDARDS* TEST METHODS* QUALITY CONTROL.)

AD-273 211 62-2-5 DIV. 1
CHANCE VOUGHT CORP.* DALLAS* TEX.
(*JET PLANES* *ROCKET PLANES* *HYPERVELOCITY VEHICLES* NAVAL AIRCRAFT* CONTROL SYSTEMS* SERVO SYSTEMS* HYDRAULIC SERVOMECHANISMS* *HYDRAULIC SYSTEMS* DESIGN* PACKAGING* HIGH TEMPERATURE RESEARCH* INSTALLATION* MATERIALS* COSTS* RELIABILITY.) (HYDRAULIC COUPLINGS* HYDRAULIC CONDUITS* DESIGN* TESTS* MANUFACTURING METHODS.)

AD-273 212 62-2-5 DIV. 1
CHANCE VOUGHT CORP.* DALLAS* TEX.
(*JET PLANES* *ROCKET PLANES* *HYPERVELOCITY VEHICLES* NAVAL AIRCRAFT* *HYDRAULIC SYSTEMS* CONTROL SYSTEMS* SERVO SYSTEMS* HYDRAULIC SERVOMECHANISMS* DESIGN* PACKAGING* HIGH TEMPERATURE RESEARCH* INSTALLATION.) (METAL SEALS* HYDRAULIC SEALS* HYDRAULIC VALVES* HYDRAULIC CONDUITS* HYDRAULIC ACTUATORS* MATERIALS* MANUFACTURING METHODS* TESTS* RELIABILITY.) (METALS* STAINLESS STEEL* PHYSICAL PROPERTIES.)

HYDRODYNAMICS

AD-273 327 62-2-5 DIV. 31
DAVIDSON LAB., STEVENS INST. OF TECH., HOBOKEN, N. J.
(•SHIP HULLS, SHIP MODELS, •MARINE PROPELLERS, •HYDRODYNAMICS.) (THRUST AND TORQUE IN BODIES OF REVOLUTION, DRAG.) (BESSEL FUNCTIONS, POLYNOMIALS, HARMONIC ANALYSIS.)

AD-273 209 62-2-5 DIV. 22
BALLISTIC RESEARCH LABS., ABERDEEN PROVING GROUND, MD.
(•HYDRODYNAMICS, THEORY OF DETONATION.) (•PENTOLITE, DETONATION, VELOCITY, PRESSURE.) (DETONATION WAVES, THERMODYNAMICS, EQUATIONS OF STATE.) (•EXPLOSIVES, DETONATION, MATHEMATICAL ANALYSIS.) (GASES, SOLIDS, ENTROPY.)

AD-273 328 62-2-5 DIV. 9
DAVIDSON LAB., STEVENS INST. OF TECH., HOBOKEN, N. J.
(•HYDROFOILS AND •AIRFOILS, •FLUTTER, VELOCITY AND FREQUENCY.) (ELASTICITY, STRESSES, •HYDRODYNAMICS, STABILITY, TESTS.) (LABORATORY EQUIPMENT, EXPERIMENTAL DATA, TABLES.)

HYDROFOILS

AD-273 328 62-2-5 DIV. 9
DAVIDSON LAB., STEVENS INST. OF TECH., HOBOKEN, N. J.
(•HYDROFOILS AND •AIRFOILS, •FLUTTER, VELOCITY AND FREQUENCY.) (ELASTICITY, STRESSES, •HYDRODYNAMICS, STABILITY, TESTS.) (LABORATORY EQUIPMENT, EXPERIMENTAL DATA, TABLES.)

HYDROGEN

AD-273 144 62-2-5 DIV. 20
PESCO PRODUCTS DIV., BORG-WARNER CORP., BEDFORD, MASS.
(FLUID MECHANICS, •LIQUID ROCKET PROPELLANTS, •HYDROGEN.) (BOILING, TURBULENCE, FLUID FLOW.) (•FUEL INJECTION, FUEL TANKS, DESIGN.)

AD-273 407 62-2-5 DIV. 4
FOREIGN TECH. DIV., AIR FORCE SYSTEMS COMMAND WRIGHT-PATTERSON AIR FORCE BASE, OHIO.
(•HYDROGEN, ATOMS, •HYDROPEROXIDES, •HYDROXIDES, CHEMICAL REACTIONS, RECOMBINATION REACTIONS, REACTION KINETICS, PARAMAGNETIC RESONANCE.) USSR, PEROXIDES.

HYDROGEN COMPOUNDS

AD-273 299 62-2-5 DIV. 7
FLORIDA U. ENGINEERING AND INDUSTRIAL EXPERIMENT STATION, GAINESVILLE.
(•FUEL CELLS, POWER SUPPLIES, •HYDROGEN COMPOUNDS, •OXYGEN, •BROMIDES, OXIDATION TO BROMINE, ELECTROLYTIC CELLS, CHEMICAL REACTIONS, CATALYSTS, NITROGEN COMPOUNDS, OXIDES, OXIDATION-REDUCTION REACTIONS.) CHEMICAL ANALYSIS.

HYDROPEROXIDES

AD-273 407 62-2-5 DIV. 4
FOREIGN TECH. DIV., AIR FORCE SYSTEMS COMMAND WRIGHT-PATTERSON AIR FORCE BASE, OHIO.
(•HYDROGEN, ATOMS, •HYDROPEROXIDES, •HYDROXIDES, CHEMICAL REACTIONS, RECOMBINATION REACTIONS, REACTION KINETICS, PARAMAGNETIC RESONANCE.) USSR, PEROXIDES.

HYDROXIDES

AD-273 407 62-2-5 DIV. 4
FOREIGN TECH. DIV., AIR FORCE SYSTEMS COMMAND WRIGHT-PATTERSON AIR FORCE BASE, OHIO.
(•HYDROGEN, ATOMS, •HYDROPEROXIDES, •HYDROXIDES, CHEMICAL REACTIONS, RECOMBINATION REACTIONS, REACTION KINETICS, PARAMAGNETIC RESONANCE.) USSR, PEROXIDES.

HYPERVELOCITY PROJECTILES

AD-273 236 62-2-5 DIV. 25
LITTLE, ARTHUR D., INC., CAMBRIDGE, MASS.
(•METEORITES, SATELLITE VEHICLES.)
(•PELLETS, •HYPERVELOCITY PROJECTILES, •IMPACT SHOCK, DYNAMICS, PARTICLES.)

HYPERVELOCITY VEHICLES

AD-273 209 62-2-5 DIV. 1
CHANCE VOUGHT CORP., DALLAS, TEX.
(•JET PLANES, •ROCKET PLANES, •HYPERVELOCITY VEHICLES, NAVAL AIRCRAFT, CONTROL SYSTEMS, SERVO SYSTEMS, HYDRAULIC SERVOMECHANISMS, •HYDRAULIC SYSTEMS, DESIGN, PACKAGING, HIGH TEMPERATURE RESEARCH, INSTALLATION.) (HYDRAULIC VALVES, HYDRAULIC SEALS, METAL SEALS, DESIGN, MATERIALS, PACKAGING, TESTS, TEST METHODS.)

AD-273 210 62-2-5 DIV. 1
CHANCE VOUGHT CORP., DALLAS, TEX.
(•JET PLANES, •ROCKET PLANES, •HYPERVELOCITY VEHICLES, NAVAL AIRCRAFT, CONTROL SYSTEMS, SERVO SYSTEMS, HYDRAULIC SERVOMECHANISMS, •HYDRAULIC SYSTEMS, DESIGN, PACKAGING, HIGH TEMPERATURE RESEARCH, INSTALLATION, MATERIALS, COSTS, RELIABILITY.) (HYDRAULIC COUPLINGS, HYDRAULIC CONDUITS, DESIGN, TESTS, MANUFACTURING METHODS.)

AD-273 211 62-2-5 DIV. 1
CHANCE VOUGHT CORP., DALLAS, TEX.
(•JET PLANES, •ROCKET PLANES, •HYPERVELOCITY VEHICLES, NAVAL AIRCRAFT, CONTROL SYSTEMS, SERVO SYSTEMS, HYDRAULIC SERVOMECHANISMS, •HYDRAULIC SYSTEMS, DESIGN, PACKAGING, HIGH TEMPERATURE RESEARCH, INSTALLATION, MATERIALS, COSTS, RELIABILITY.) (HYDRAULIC COUPLINGS, HYDRAULIC CONDUITS, DESIGN, TESTS, MANUFACTURING METHODS.)

AD-273 212 62-2-5 DIV. 1
CHANCE VOUGHT CORP., DALLAS, TEX.
(•JET PLANES, •ROCKET PLANES, •HYPERVELOCITY VEHICLES, NAVAL AIRCRAFT, •HYDRAULIC SYSTEMS, CONTROL SYSTEMS, SERVO SYSTEMS, HYDRAULIC SERVOMECHANISMS, DESIGN, PACKAGING, HIGH TEMPERATURE RESEARCH, INSTALLATION.) (METAL SEALS, HYDRAULIC SEALS, HYDRAULIC VALVES, HYDRAULIC CONDUITS, HYDRAULIC ACTUATORS, MATERIALS, MANUFACTURING METHODS, TESTS, RELIABILITY.) (METALS, STAINLESS STEEL, PHYSICAL PROPERTIES.)

AD-273 255 62-2-5 DIV. 12
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION WASHINGTON, D. C.
(RE-ENTRY VEHICLES, •HYPERVELOCITY VEHICLES, RE-ENTRY AERODYNAMICS, •AERODYNAMIC HEATING, AIRFRAMES, STRUCTURES.) (AIRFRAMES WITH THERMAL INSULATION OR COOLING, DESIGN, STRESSES, LOAD DISTRIBUTION, DEFORMATION, BUCKLING.) (HEAT TRANSFER, MATHEMATICAL ANALYSIS.)

AD-273 [illegible] 62-2-5 DIV. 1
(•AIRPLANES, HYPERVELOCITY VEHICLES, RUNWAYS, LANDING GEAR, TAKE-OFF, AIRPLANE LANDINGS, LOAD DISTRIBUTION, MATHEMATICAL ANALYSIS, STATISTICAL ANALYSIS, INTEGRAL EQUATIONS, DIFFERENTIAL EQUATIONS.) (DIGITAL COMPUTERS, ANALOG COMPUTERS, PROGRAMMING.) DYNAMICS, DAMPING.

•IDENTIFICATION

AD-273 241 62-2-5 DIV. 30
MELPAR, INC., •WATERTOWN, MASS.
(•STATISTICAL ANALYSIS, THEORY AS APPLIED TO DECISION THEORY, •GUIDED MISSILES, •IDENTIFICATION AND DISCRIMINATORS (DECOY).) (DIGITAL COMPUTERS, CODING, SIGNAL-TO-NOISE RATIO, COMMUNICATIONS THEORY, DIGITAL CONVERTERS, NUMERICAL METHODS AND PROCEDURES, MATRIX ALGEBRA, PROBABILITY, INTEGRAL EQUATIONS, TRANSFORMATIONS (MATHEMATICS).)

•IMPACT SHOCK

AD-273 236 62-2-5 DIV. 25
LITTLE, ARTHUR D., INC., CAMBRIDGE, MASS.
(•METEORITES, SATELLITE VEHICLES.)
(•PELLETS, •HYPERVELOCITY PROJECTILES, •IMPACT SHOCK, DYNAMICS, PARTICLES.)

•IMPINGERS

AD-273 198 62-2-5 DIV. 3
ARMY SIGNAL RESEARCH AND DEVELOPMENT LAB., FORT MONMOUTH, N. J.
(•AEROSOLS, PARTICLES, MEASUREMENT, SAMPLING, DOSAGE, •IMPINGERS, PHOTOMETERS, LIGHT, SCATTERING, SPECTROPHOTOMETER, CALIBRATION, EFFECTIVENESS.)

•INDUSTRIAL EQUIPMENT

AD-273 338 62-2-5 DIV. 26
AEROPROJECTS, INC., WEST CHESTER, PA.
(HEAT RESISTANT ALLOYS, REFRACTORY MATERIALS, METALS, ALLOYS, SHEETS, METAL PLATES, •WELDING, •ULTRASONICS, ENERGY TRANSDUCERS, •INDUSTRIAL EQUIPMENT.) •WELDED JOINTS, NICKEL ALLOYS, IOBIUM ALLOYS (D-31), COBALT ALLOYS, CHROMIUM ALLOYS, MOLYBDENUM ALLOYS, TITANIUM ALLOYS, IRON ALLOYS, STEEL, STAINLESS STEEL, TUNGSTEN.

•INERTIAL GUIDANCE

AD-273 002 62-2-5 DIV. 25
SPACE TECHNOLOGY LABS., INC., LOS ANGELES, CALIF.
(OPTICS, •OPTICAL EQUIPMENT, THEODOLITES, COLLIMATORS AND REFLECTORS FOR GUIDED MISSILES AND LABORATORIES.) (•INERTIAL GUIDANCE, •INSTRUMENTATION, DESIGN AND TESTS.)

•INFORMATION THEORY

AD-273 239 62-2-5 DIV. 6
LINCOLN LAB., MASS. INST. OF TECH., LEXINGTON.
(•INFORMATION THEORY, FUNCTIONS, FOURIER ANALYSIS, INTEGRAL TRANSFORMS, •RADIO FREQUENCY POWER, PROBABILITY, RADIO SIGNALS.)

AD-273 403 62-2-5 DIV. 30
FOREIGN TECH. DIV., AIR FORCE SYSTEMS COMMAND WRIGHT-PATTERSON AIR FORCE BASE, OHIO.
(•CODING, SEQUENCES, PROBABILITY, •ERRORS, •INFORMATION THEORY, INEQUALITIES.) (RADIO SIGNALS, TRANSMISSION, •DATA TRANSMISSION SYSTEMS, NOISE (RADIO).) USSR.

•INFRARED RADIATION

AD-273 092 62-2-5 DIV. 2
BOEING CO., SEATTLE, WASH.
(•INFRARED RADIATION FROM ATMOSPHERE AS BACKGROUND FOR •SATELLITE VEHICLES.) (REFLECTION, SCATTERING OF INFRARED RADIATION FROM AIR, CLOUDS, SUN, EARTH.) (CARBON DIOXIDE, OZONE, WATER VAPOR, ICE, CIRRUS CLOUDS.) (AEROSOLS IN STRATOSPHERE.) (ATMOSPHERE, MOLECULES, ABSORPTION.)

AD-273 181 62-2-5 DIV. 25
CENTRE DE PHYSIQUE ELECTRONIQUE ET CORPUSCULAIRE (FRANCE).
(•INFRARED RADIATION, •ELECTRON BEAMS FROM ELECTRON GUNS, TESTS.) (FEASIBILITY STUDIES, •BACKWARD-WAVE OSCILLATORS, •WAVEFORM GENERATORS, DESIGN.) PHOTOGRAPHIC ANALYSIS.

AD-273 323 62-2-5 DIV. 25
OHIO STATE U. RESEARCH FOUNDATION, COLUMBUS.
(•INFRARED RADIATION, •ABSORPTION BY VIBRATION, ROTATION, GASES CELLS OF NITROGEN, OXIDES, ISOTOPES.)

•INSTRUMENTATION

AD-273 002 62-2-5 DIV. 25
SPACE TECHNOLOGY LABS., INC., LOS ANGELES, CALIF.
(OPTICS, •OPTICAL EQUIPMENT, THEODOLITES, COLLIMATORS AND REFLECTORS FOR GUIDED MISSILES AND LABORATORIES.) (•INERTIAL GUIDANCE, •INSTRUMENTATION, DESIGN AND TESTS.)

•INTEGRAL EQUATIONS

AD-273 118 62-2-5 DIV. 25
ALLIED RESEARCH ASSOCIATES, INC., BOSTON, MASS.
(•HEAT TRANSFER, •SOLIDS, SHEETS, •THERMAL CONDUCTIVITY.) (•INTEGRAL EQUATIONS, DIFFERENTIAL EQUATIONS, NUMERICAL ANALYSIS.)

AD-273 342 62-2-5 DIV. 25
AVCO RESEARCH LAB., EVERETT, MASS.
(•HEAT TRANSFER IN LAMINAR BOUNDARY LAYER, •GUIDED MISSILES, AXIALLY SYMMETRIC FLOW.) (•INTEGRAL EQUATIONS, COMBINATORIAL ANALYSIS, LINEAR SYSTEMS.)

•INTEGRATION

AD-273 205 62-2-5 DIV. 9
BALLISTIC RESEARCH LABS., ABERDEEN PROVING GROUND, MD.
(•SHOCK WAVES, •BLAST, SPHERES, •TURBULENT FLOW, SPACE CHARGES.) (HYDRODYNAMICS, EQUATIONS, PARTICLES, VELOCITY.) (PIEZOELECTRIC GAGES, MEASUREMENT.) (•NUMERICAL ANALYSIS, •INTEGRATION, PARTIAL DIFFERENTIAL EQUATIONS.) DIGITAL COMPUTERS.

•IONIZATION CHAMBERS

AD-273 256 62-2-5 DIV. 30
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION, WASHINGTON, D. C.
(SPACE ENVIRONMENTAL CONDITIONS, •ULTRAVIOLET RADIATION, MEASUREMENT OF •IONIZATION CHAMBERS, MANUFACTURING METHODS, DESIGN, CALIBRATION, VACUUM APPARATUS.) (SATELLITE VEHICLES, SPACE PROBES, INSTRUMENTATION.) (MATERIALS, CERAMIC MATERIALS.)

•IONOSPHERIC DISTURBANCES

AD-273 433 62-2-5 DIV. 2
AMERICAN METEOROLOGICAL SOCIETY, BOSTON, MASS.
(•IONOSPHERIC DISTURBANCES, •ELECTROMAGNETIC FIELDS, REFLECTION, •DRIFT, •IND.) (STATISTICAL PROCESSES, •STATISTICAL FUNCTIONS.) USSR.

•IONOSPHERIC PROPAGATION

AD-273 021 62-2-5 DIV. 2
SASKATCHEWAN U. (CANADA).
(RADIO SIGNALS, •IONOSPHERIC PROPAGATION, •METEORS, WAKE, DETECTION, •RADAR ECHO AREAS, REFLECTION, ULTRA HIGH FREQUENCY.)

***IONS**

AD-273 223 62-2-5 DIV. 25
ALLISON DIV., GENERAL MOTORS CORP., INDIANAPOLIS, IND.
(*KINETIC THEORY OF GASES)
*CESIUM, GAS FLOW THROUGH CAPILLARY TUBES FOR *THERMIONIC EMISSION OF *IONS, *ELECTRONS, PLASMA PHYSICS, (TUNGSTEN, MOLYBDENUM, TANTALUM,) (INTEGRAL EQUATIONS, DIFFERENTIAL EQUATIONS, MATRIX ALGEBRA, NUMERICAL ANALYSIS, GREEN'S FUNCTION,) INSTRUMENTATION.

***ISOTOPES**

AD-273 076 62-2-5 DIV. 2
MASSACHUSETTS INST. OF TECH., CAMBRIDGE.
(*METEORITES, *MINERALS, *GEOCHEMISTRY, *ISOTOPES, RADIOACTIVE ISOTOPES, *STRONTIUM, *URANIUM, AUSTRALIA, INDOCHINA INDONESIA, PHILIPPINE ISLANDS, NORTH AMERICA, CZECHOSLOVAKIA,) CHEMICAL ANALYSIS, MASS SPECTROSCOPY, X-RAY SPECTROSCOPY, FLUORESCENCE.

***JET ENGINE FUELS**

AD-273 147 62-2-5 DIV. 27
PHILLIPS PETROLEUM CO., BARTLESVILLE, OKLA.
(*TURBOJET ENGINES, DUCT INLETS, *GUIDE VANES, RELIABILITY, CORROSION, SULFUR, SEA WATER, TESTS,) (COMBUSTION CHAMBERS, COMBUSTION CHAMBER LINERS, CORROSION, EROSION, FLAMES, COMBUSTION CHAMBER GASES, TESTS,) (HYDROCARBONS, *JET ENGINE FUELS, COMBUSTION, HIGH TEMPERATURE RESEARCH,) STAINLESS STEEL, TEST EQUIPMENT.

AD-273 404 62-2-5 DIV. 10
FOREIGN TECH. DIV., AIR FORCE SYSTEMS COMMAND, WRIGHT-PATTERSON AIR FORCE BASE, OHIO.
(*JET ENGINE FUELS, COMBUSTION, DEPOSITS, CORROSION, STABILITY, CHEMICAL IMPURITIES, IMPURITIES, TEST METHODS, QUALITY CONTROL,) USSR.

***JET FIGHTERS**

AD-273 292 62-2-5 DIV. 1
DIRECTORATE OF ENGINEERING TEST, AERONAUTICAL SYSTEMS DIV., WRIGHT-PATTERSON AIR FORCE BASE, OHIO.
(*JET FIGHTERS, JET PLANES, AIRFRAMES, *VIBRATION, FLIGHT TESTING, MEASUREMENT,) (AIRCRAFT EQUIPMENT, ELECTRONIC EQUIPMENT, DESIGN,)

***JET PLANES**

AD-273 209 62-2-5 DIV. 1
CHANCE VOUGHT CORP., DALLAS, TEX.
(*JET PLANES, *ROCKET PLANES, *HYPERVELOCITY VEHICLES, NAVAL AIRCRAFT, CONTROL SYSTEMS, SERVO SYSTEMS, HYDRAULIC SERVOMECHANISMS, *HYDRAULIC SYSTEMS, DESIGN, PACKAGING, HIGH TEMPERATURE RESEARCH, INSTALLATION,) (HYDRAULIC VALVES, HYDRAULIC SEALS, METAL SEALS, DESIGN, MATERIALS, PACKAGING, TESTS, TEST METHODS,)

AD-273 210 62-2-5 DIV. 1
CHANCE VOUGHT CORP., DALLAS, TEX.
(*JET PLANES, *ROCKET PLANES, *HYPERVELOCITY VEHICLES, NAVAL AIRCRAFT, CONTROL SYSTEMS, SERVO SYSTEMS, HYDRAULIC SERVOMECHANISMS, *HYDRAULIC SYSTEMS, DESIGN, PACKAGING, HIGH TEMPERATURE RESEARCH, INSTALLATION,) (HYDRAULIC VALVES, PRESSURE SWITCHES, HYDRAULIC FLUID FILTERS, DESIGN, SPECIFICATIONS STANDARDS, TEST METHODS, QUALITY CONTROL,)

AD-273 211 62-2-5 DIV. 1
CHANCE VOUGHT CORP., DALLAS, TEX.
(*JET PLANES, *ROCKET PLANES, *HYPERVELOCITY VEHICLES, NAVAL AIRCRAFT, CONTROL SYSTEMS, SERVO SYSTEMS, HYDRAULIC SERVOMECHANISMS, *HYDRAULIC SYSTEMS, DESIGN, PACKAGING, HIGH TEMPERATURE RESEARCH, INSTALLATION,) (MATERIALS, COSTS, RELIABILITY,) (HYDRAULIC COUPLINGS, HYDRAULIC CONDUITS, DESIGN, TESTS, MANUFACTURING METHODS,)

AD-273 212 62-2-5 DIV. 1
CHANCE VOUGHT CORP., DALLAS, TEX.
(*JET PLANES, *ROCKET PLANES, *HYPERVELOCITY VEHICLES, NAVAL AIRCRAFT, *HYDRAULIC SYSTEMS, CONTROL SYSTEMS, SERVO SYSTEMS, HYDRAULIC SERVOMECHANISMS, DESIGN, PACKAGING, HIGH TEMPERATURE RESEARCH, INSTALLATION,) (METAL SEALS, HYDRAULIC SEALS, HYDRAULIC VALVES, HYDRAULIC CONDUITS, HYDRAULIC ACTUATORS, MATERIALS, MANUFACTURING METHODS, TESTS, RELIABILITY,) (METALS, STAINLESS STEEL, PHYSICAL PROPERTIES,)

***JETS**

AD-273 312 62-2-5 DIV. 9
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION, WASHINGTON, D. C.
(BODIES OF REVOLUTION, *CYLINDRICAL BODIES, SUPERSONICS, AERODYNAMICS, EXHAUST GASES, *JETS, INTERFERENCE, PRESSURE, SHOCK WAVES, MODEL TESTS, WIND TUNNEL MODELS,) (DECELERATION, AERODYNAMIC HEATING, DRAG, REDUCTION,) (RE-ENTRY VEHICLES, HYPERVELOCITY VEHICLES, GUIDED MISSILES, CONTROL, STAGING,) (NOZZLES, SUPERSONIC NOZZLES,)

***JOB ANALYSIS**

AD-273 934 62-2-5 DIV. 28
ENGINEERING PSYCHOLOGY LAB., U. OF PITTSBURGH, PA.
(*HANDBOOKS, *HUMAN ENGINEERING, *JOB ANALYSIS,) (*PERCEPTION, BEHAVIOR, MOTOR REACTIONS, PSYCHOMOTOR TESTS,) (CONTROL SYSTEMS, TRACKING, CODING, DISPLAY SYSTEMS, DESIGN, OPERATION, EFFECTIVENESS,)

***KINETIC THEORY**

AD-273 223 62-2-5 DIV. 25
ALLISON DIV., GENERAL MOTORS CORP., INDIANAPOLIS, IND.
(*KINETIC THEORY OF GASES, *CESIUM, GAS FLOW THROUGH CAPILLARY TUBES FOR *THERMIONIC EMISSION OF *IONS, *ELECTRONS, PLASMA PHYSICS,) (TUNGSTEN, MOLYBDENUM, TANTALUM,) (INTEGRAL EQUATIONS, DIFFERENTIAL EQUATIONS, MATRIX ALGEBRA, NUMERICAL ANALYSIS, GREEN'S FUNCTION,) INSTRUMENTATION.

AD-273 412 62-2-5 DIV. 20
FOREIGN TECH. DIV., AIR FORCE SYSTEMS COMMAND, WRIGHT-PATTERSON AIR FORCE BASE, OHIO.
(*POWER REACTORS, *SPHERES, PARTICLES, VELOCITY, DIFFUSION, SCATTERING, REFLECTION,) (HETEROGENEOUS REACTORS, *BOILING WATER REACTORS, *NUCLEAR POWER PLANTS, *KINETIC THEORY,) (GRAPHITE, BERYLLIUM, PLUTONIUM COMPOUNDS, STATISTICAL DISTRIBUTIONS, STATISTICAL FUNCTIONS, POLYNOMIALS, FUNCTIONS, INTEGRAL EQUATIONS, NUMERICAL METHODS AND PROCEDURES, TABLES,)

***LAMINAR BOUNDARY LAYER**

AD-273 069 62-2-5 DIV. 23
INSTITUTO NACIONAL DE TECNICA AERONAUTICA (SPAIN).
(*LAMINAR BOUNDARY LAYER, *FLAMES, *DIFFUSION, SPECIFIC HEAT, CONDUCTIVITY, CHEMICAL REACTIONS, KINETIC THEORY, FUELS, OXIDIZERS,) (DIFFERENTIAL EQUATIONS, INTEGRAL EQUATIONS, GREEN'S FUNCTION, POLYNOMIALS,) STRUCTURES OF FLAMES.

AD-273 308 62-2-5 DIV. 25
AEROPHYSICS LAB., MASS. INST. OF TECH., CAMBRIDGE.
(*THERMODYNAMICS, THERMAL DIFFUSION AND HEAT TRANSFER IN BOUNDARY LAYERS, *LAMINAR BOUNDARY LAYERS,) (TRANSPORT PROPERTIES, RELAXATION TIME, HELIUM, AIR, GAS FLOW, COOLANTS, COOLING,)

AD-273 311 62-2-5 DIV. 9
(*HEAT TRANSFER FROM *LAMINAR BOUNDARY LAYER TO *AERODYNAMIC CONFIGURATIONS, MEASUREMENT IN GASES AT SUPERSONIC FLOW AND HYPERSONIC FLOW,) (*WIND TUNNELS, MACH NUMBER, TESTS,)

***LANGUAGE**

AD-273 614 62-2-5 DIV. 30
THOMAS J. WATSON RESEARCH CENTER, YORKTOWN HEIGHTS, N. Y.
(*DIGITAL COMPUTERS, CODING, *LANGUAGE, *TRANSLATIONS, *DATA PROCESSING SYSTEMS, AUTOMATION,)

***LATTICES**

AD-273 227 62-2-5 DIV. 17
INDIANA STEEL PRODUCTS CO., VALPARAISO.
(*MAGNETS, *MAGNETIC MATERIALS, *SINGLE CRYSTALS, *LATTICES, ALLOYS, IRON ALLOYS, NICKEL ALLOYS, COBALT ALLOYS, ALUMINUM ALLOYS, PROCESSING, PRECIPITATION, PHASE STUDIES, CASTING, HEAT TREATMENT,) (TEST METHODS, ELECTRON MICROSCOPY, ELECTRON DIFFRACTION ANALYSIS,)

***LEAD**

AD-273 436 62-2-5 DIV. 17
OKLAHOMA U. RESEARCH INST., NORMAN.
(METALS, METALLIC CRYSTALS, *GRAINS (METALLURGY), DIFFUSION, CHEMICAL IMPURITIES, LATTICES, *LEAD, TRACER STUDIES, CRYSTALS, AUTORADIOGRAPHY,)

***LENS ANTENNAS**

AD-273 045 62-2-5 DIV. 8
STANFORD RESEARCH INST., MENLO PARK, CALIF.
(*RADAR ANTENNAS, *COUPLED ANTENNAS, DESIGN USING RADIO INTERFEROMETERS,) (WIRE SCREENS, MICROWAVE FREQUENCY, *LENS ANTENNAS, RADAR SCANNING, ELECTRONIC SCANNERS, THEORY, DESIGN,) (DIRECTION FINDING, COMMUNICATION EQUIPMENT, HIGH FREQUENCY, ANTENNAS,)

***LIGHT**

AD-273 113 62-2-5 DIV. 9
ANTENNA LAB., OHIO STATE U. RESEARCH FOUNDATION, COLUMBUS.
(DETECTORS, *MICROWAVE EQUIPMENT, *OPTICAL EQUIPMENT, *MAGNETO-OPTIC ROTATION, *PARAMAGNETIC CRYSTALS, MAGNETIC FIELDS, CRYSTAL DEFECTS, LATTICES, NUCLEAR SPINS, CRYSTAL STRUCTURE, RELAXATION TIME, SUPERREGENERATION, THEORY, DESIGN, SENSITIVITY,) (ELECTROMAGNETIC WAVES, *MICROWAVES, RESONANCE ABSORPTION, *LIGHT, MODULATION, RADIOFREQUENCY POWER, DETECTION,)

***LIGHT COMMUNICATION SYSTEMS**

AD-273 273 62-2-5 DIV. 5
PHILCO CORP., BLUE BELL, PA.
(*LIGHT COMMUNICATION SYSTEMS, *OPTICAL TRACKING, COMMUNICATION SYSTEMS, TRACKING, *SATELLITE VEHICLES, *LUNAR PROBE, *SPACESHIPS, COMMUNICATIONS THEORY,) (SATELLITE ATTITUDE, GYROSCOPES, ORBITAL FLIGHT PATHS,) (SATELLITE ATTITUDE STABILIZATION) (TRACKING WITH THIN FILMS, DETECTORS,) (SATELLITE VEHICLES, ATTITUDES, CONFIGURATION,) SIGNAL-TO-NOISE RATIO, PHOTOMULTIPLIERS.

***LIQUID ROCKET PROPELLANTS**

AD-273 146 62-2-5 DIV. 20
PESCO PRODUCTS DIV., BORG-WARNER CORP., BEDFORD, MASS.
(FLUID MECHANICS, *LIQUID ROCKET PROPELLANTS, *HYDROGEN,) (BOILING, TURBULENCE, FLUID FLOW,) (*FUEL INJECTION, FUEL TANKS, DESIGN,)

***LITHIUM COMPOUNDS**

AD-273 425 62-2-5 DIV. 14
MATERIALS RESEARCH LAB., U. OF CALIF., BERKELEY.
(*LITHIUM COMPOUNDS, *FLUORIDES, IONS, *CRYSTALS, *SINGLE CRYSTALS, CRYSTAL STRUCTURE, LATTICES,) (TESTS, MECHANICAL PROPERTIES, DEFORMATION, PLASTICITY, FRACTURE (MECHANICS), RUPTURE, FAILURE (MECHANICS), TENSILE PROPERTIES, BRITTLE MATERIALS,) GROWTH.

***LUBRICATION**

AD-273 240 62-2-5 DIV. 9
MECHANICAL TECHNOLOGY INC., LATHAM, N. Y.
(*GAS BEARINGS, COMPRESSIBLE FLOW, *VISCOSITY, FLUID FLOW,) (PARTIAL DIFFERENTIAL EQUATIONS, PERTURBATION THEORY,) (BEARINGS, *LUBRICATION,)

***LUNAR PROBES**

AD-273 273 62-2-5 DIV. 5
PHILCO CORP., BLUE BELL, PA.
(*LIGHT COMMUNICATION SYSTEMS, *OPTICAL TRACKING, COMMUNICATION SYSTEMS, TRACKING, *SATELLITE VEHICLES, *LUNAR PROBE, *SPACESHIPS, COMMUNICATIONS THEORY,) (SATELLITE ATTITUDE, GYROSCOPES, ORBITAL FLIGHT PATHS,) (SATELLITE ATTITUDE STABILIZATION) (TRACKING WITH THIN FILMS, DETECTORS,) (SATELLITE VEHICLES, ATTITUDES, CONFIGURATION,) SIGNAL-TO-NOISE RATIO, PHOTOMULTIPLIERS.

***MACHINE TRANSLATION**

AD-273 159 62-2-5 DIV. 30
TEXAS U., AUSTIN.
(*MACHINE TRANSLATION, LANGUAGE, *GERMANY,) PROBABILITY.

***MAGNESIUM COMPOUNDS**

AD-273 203 62-2-5 DIV. 4
DIRECTORATE OF MATERIALS AND PROCESSES, AERONAUTICAL SYSTEMS DIV., WRIGHT-PATTERSON AIR FORCE BASE, OHIO.
(*PYROLYSIS OF *MAGNESIUM COMPOUNDS AND *PERCHLORATES, MEASUREMENT BY DETERMINATION OF CHLORIDES,) (REAGENTS, IRON COMPOUNDS, PERCHLORATES,) CHEMICAL REACTIONS, SPECTROPHOTOMETERS.

AD-273 222 62-2-5 DIV. 14
GENERAL DYNAMICS/ASTRONAUTICS, SAN DIEGO, CALIF.
(*CERAMIC MATERIALS, *BRITTLE MATERIALS, SOLIDS, SINGLE CRYSTALS, *DEFORMATION, *PLASTICITY, MECHANICAL PROPERTIES, PHYSICAL PROPERTIES,) (TEST METHODS, TEST EQUIPMENT,) (*SODIUM COMPOUNDS, CHLORIDES, *MAGNESIUM COMPOUNDS, OXIDES, DATA,) SOLID STATE PHYSICS.

AD-273 314 62-2-5 DIV. 17
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION, WASHINGTON, D. C.
(ALLOYS, METALS, OXIDES, *DISPERSION HARDENING OF *NICKEL ALLOYS WITH *MAGNESIUM COMPOUNDS, MIXTURES, BALL MILLS, POWDER METALS, POWDER METALLURGY, PROCESSING, SINTERING, LATRUSION,) METAL FORMING PRESSES, DENSITY, CHEMICAL IMPURITIES.

***MAGNETIC FIELDS**

AD-273 101 62-2-5 DIV. 6
CENTRE DE PHYSIQUE ELECTRONIQUE ET CORPUSCULAIRE (FRANCE).
((*ELECTRON GUNS, *ELECTRON BEAMS, *OPTICAL SYSTEMS, *MAGNETIC FIELDS, NOISE (RADIO), MEASUREMENT, TESTS, TEST EQUIPMENT, THEORY, FRANCE,) (MAGNETRONS, CATHODES (ELECTRON TUBES), TEMPERATURE, ELECTRONS, ELECTRODES, ELECTRIC CURRENT, IMPEDANCE, VOLTMETERS, OSCILLOSCOPES, DIODES, SPACE CHARGES.

***MAGNETIC MATERIALS**

AD-273 227 62-2-5 DIV. 17
INDIANA STEEL PRODUCTS CO., VALPARAISO, IND.
((*MAGNETS, *MAGNETIC MATERIALS, *SINGLE CRYSTALS, *LATTICES, ALLOYS, IRON ALLOYS, NICKEL ALLOYS, COBALT ALLOYS, ALUMINUM ALLOYS, PROCESSING, PRECIPITATION, PHASE STUDIES, CASTING, HEAT TREATMENT,) (TEST METHODS, ELECTRON MICROSCOPY, ELECTRON DIFFRACTION ANALYSIS,)

***MAGNETIC SUSCEPTIBILITY**

AD-273 017 62-2-5 DIV. 17
CASE INST. OF TECH., CLEVELAND, OHIO.
((METALS, *ZINC, CRYSTALS, SINGLE CRYSTALS, BRILLOUIN ZONES, *MAGNETIC SUSCEPTIBILITY, MAGNETIC FIELDS, QUANTUM MECHANICS ATOMIC ENERGY LEVELS, THEORY,) SOLID STATE PHYSICS.

***MAGNETO-OPTIC ROTATION**

AD-273 113 62-2-5 DIV. 6
ANTENNA LAB., OHIO STATE U. RESEARCH FOUNDATION, COLUMBUS.
((DETECTORS, *MICROWAVE EQUIPMENT, *OPTICAL EQUIPMENT, *MAGNETO-OPTIC ROTATION, *PARAMAGNETIC CRYSTALS, MAGNETIC FIELDS, CRYSTAL DETECTORS, LATTICES, NUCLEAR SPINS, CRYSTAL STRUCTURE, RELAXATION TIME, SUPERREGENERATION, THEORY, DESIGN, SENSITIVITY,) (ELECTROMAGNETIC WAVES, *MICROWAVES, RESONANCE ABSORPTION, *LIGHT MODULATION, RADIOFREQUENCY POWER, DETECTION,)

AD-273 145 62-2-5 DIV. 25
RESEARCH LAB. OF ELECTRONICS, MASS. INST. OF TECH., CAMBRIDGE.
((*SOLID STATE PHYSICS, ELECTRON BEAMS, *THIN FILMS, *MAGNETO-OPTIC ROTATION, COBALT, DIELECTRICS, FERROMAGNETIC MATERIAL, MAGNETIC EFFECT, PERTURBATION THEORY,) (MOLECULAR STRUCTURE, FEEDBACK,) (LATTICES, CRYSTAL STRUCTURE, INTERMETALLIC COMPOUNDS, TIN COMPOUNDS, COPPER COMPOUNDS, IRON COMPOUNDS, ALGEBRA,) (COMPUTERS, *DIGITAL COMPUTERS,) COMPUTER SYSTEMS THEORY.

***MAGNETOHYDRODYNAMICS**

AD-273 072 62-2-5 DIV. 25
LINCOLN LAB., MASS. INST. OF TECH., LEXINGTON.
((ATMOSPHERE ENTRY, RE-ENTRY VEHICLES, *PLASMA PHYSICS, *RE-ENTRY AERODYNAMICS, *MAGNETOHYDRODYNAMICS,) (*ELECTROMAGNETIC FIELDS, *GAS IONIZATION, ELECTRONS, DENSITY, MEASUREMENT IN TURBULENT FLOW, *MACH, SHOCK WAVES, ABLATION,) (WAVE TRANSMISSION, REFLECTION, S BAND, ULTRA HIGH FREQUENCY, RADAR TRACKING, RADAR SIGNALS,) (TELEMETER SYSTEMS, DATA PROCESSING SYSTEMS, PROGRAMMING, DIGITAL COMPUTERS,) (INSTRUMENTATION, PHOTOGRAPHY, SCHLIEREN PHOTOGRAPHY,) OPTICAL TRACKING.

AD-273 247 62-2-5 DIV. 25
MATHEMATICS RESEARCH CENTER, U. OF WISCONSIN, MADISON.
((*SHOCK WAVES, FLUID FLOW, *MAGNETOHYDRODYNAMICS, PARTICLES, MAGNETIC FIELDS,) (COMPRESSIBLE FLOW, GAS IONIZATION, *FLUID MECHANICS, ACOUSTICS,) (*PERTURBATION THEORY, PARTIAL DIFFERENTIAL EQUATIONS,)

***MAGNETS**

AD-273 227 62-2-5 DIV. 17
INDIANA STEEL PRODUCTS CO., VALPARAISO, IND.
((*MAGNETS, *MAGNETIC MATERIALS, *SINGLE CRYSTALS, *LATTICES, ALLOYS, IRON ALLOYS, NICKEL ALLOYS, COBALT ALLOYS, ALUMINUM ALLOYS, PROCESSING, PRECIPITATION, PHASE STUDIES, CASTING, HEAT TREATMENT,) (TEST METHODS, ELECTRON MICROSCOPY, ELECTRON DIFFRACTION ANALYSIS,)

***MAINTENANCE**

AD-273 103 62-2-5 DIV. 26
NORTHROP CORP., HAWTHORNE, CALIF.
((*MAINTENANCE, THEORY, OPERATION COSTS, TIME, PRODUCTION, FAILURE, SUPPLIES,) (*AIR FORCE OPERATIONS, EFFECTIVENESS, MAINTENANCE PERSONNEL,)

***MAN**

AD-273 098 62-2-5 DIV. 16
AEROSPACE MEDICAL LAB., AERONAUTICAL SYSTEMS DIV., WRIGHT-PATTERSON AIR FORCE BASE, OHIO.
((*WEIGHTLESSNESS, *SPACE MEDICINE, MAN,) (TEST METHODS, AIRBORNE, FLIGHT TESTING, *WATER SIMULATION, ROTATION,) (BEHAVIOR, STRESS (PSYCHOLOGY), SENSORY PERCEPTION, REACTION (PSYCHOLOGY),) (STRESS (PHYSIOLOGY), HEART, LAB, MOTION SICKNESS, MOTOR REACTIONS,)

***MANAGEMENT ENGINEERING**

AD-273 034 62-2-5 DIV. 30
ELECTRICAL ENGINEERING RESEARCH LAB., U. OF ILLINOIS, URBANA.
((STATISTICAL ANALYSIS, *MATHEMATICAL LOGIC, CURVE FITTING, CONSTRUCTION, SCHEDULING,) (*MANAGEMENT ENGINEERING, *OPERATIONS RESEARCH, PRODUCTION, PROGRAMMING,)

***MANUFACTURING METHODS**

AD-273 020 62-2-5 DIV. 17
FANSTEEL METALLURGICAL CORP., NORTH CHICAGO, ILL.
((PRODUCTION AND PROCESSING OF *TUNGSTEN, *SHEETS,) (*MANUFACTURING METHODS, PREPARATION OF POWDER METALS BY HYDROGEN, REDUCTION OF AMMONIUM RADICALS, TUNGSTATES BY POWDER METALLURGY, SINTERING AND *ROLLING MILLS,) (TRANSITION TEMPERATURE, HEAT TREATMENT, DEFORMATION, MECHANICAL PROPERTIES, TENSILE PROPERTIES,)

AD-273 130 62-2-5 DIV. 8
INTERNATIONAL RECTIFIER CORP., LOS ANGELES, CALIF.
((*RECTIFIERS, *SILICON, *DIODES ELECTRON TUBES, SEMICONDUCTORS, THERMODYNAMICS, TESTS, TEST METHODS, CIRCUIT TESTERS, RELIABILITY,)
DESIGN, PRODUCTION, *MANUFACTURING METHODS,

AD-273 270 62-2-5 DIV. 8
RADIO CORP. OF AMERICA, SOMERVILLE, N. J.
((*TRANSISTORS, SILICON, DIOXIDES, SILICON COMPOUNDS, DIFFUSION, VERY HIGH FREQUENCY, *MANUFACTURING METHODS, PRODUCTION,) (CONTAINERS, GOLD PLATING, CLIMATIC FACTORS, PROCESSING,)

AD-273 439 62-2-5 DIV. 8
RADIO CORP. OF AMERICA, SOMERVILLE, N. J.
((*TRANSISTORS, SILICON, ELECTRICAL PROPERTIES, MECHANICAL PROPERTIES, RESISTANCE, TEMPERATURE, *MANUFACTURING METHODS, PROCESSING, PACKAGING, PRODUCTION, DIFFUSION,)

***MAPPING**

AD-273 463 62-2-5 DIV. 30
SYLVANIA ELECTRIC PRODUCTS, INC., *WALTHAM, MASS.
((*RESEARCH PROGRAM ADMINISTRATION, THEORY AND TEST METHODS OF MATHEMATICAL ANALYSIS, *MAPPING OF *SPEECH TRANSMISSION, *SIGNALS,) (ANALYSIS, SYNTHESIS OF DATA, SAMPLING,) (TIME FUNCTIONS, SERIES, FOURIER ANALYSIS,) (PROGRAMMING, DIGITAL COMPUTERS, COMMUNICATIONS THEORY,)

***MARINE PROPELLERS**

AD-273 027 62-2-5 DIV. 31
DAVIDSON LAB., STEVENS INST. OF TECH., HOBOKEN, N. J.
((*SHIP HULLS, SHIP MODELS, *MARINE PROPELLERS, *HYDRODYNAMICS,) (THRUST AND TORQUE IN BODIES OF REVOLUTION, DRAG,) (BESSEL FUNCTIONS, POLYNOMIALS, HARMONIC ANALYSIS,)

***MASERS**

AD-273 245 62-2-5 DIV. 8
MICROWAVE LAB., STANFORD U., CALIF.
((*MICROWAVES, MICROWAVE FREQUENCY, *THEORY, *OPTICS, FREQUENCY, *MASERS, INFRARED RADIATION,) MATERIALS.

***MATHEMATICAL COMPUTER DATA**

AD-273 097 62-2-5 DIV. 28
ARIZONA STATE U., TEMPLE.
((*BEHAVIOR, MAN, EFFECTIVENESS, JOB ANALYSIS, MATHEMATICAL ANALYSIS, *MATHEMATICAL COMPUTER DATA,) (PSYCHOLOGY, THEORY,)

***MATHEMATICAL LOGIC**

AD-273 024 62-2-5 DIV. 30
MICROWAVE RESEARCH INST., POLYTECHNIC INST. OF BROOKLYN, N. Y.
((*FEEDBACK, *SENSITIVITY, FUNCTIONS, SIGNAL-TO-NOISE RATIO, *ERRORS,) (*MATHEMATICAL LOGIC, *CONTROL SYSTEMS, RELIABILITY, DESIGN,) (NONLINEAR SYSTEMS, COMPUTERS, EXPERIMENTAL DATA, TABLES,)

AD-273 334 62-2-5 DIV. 30
ELECTRICAL ENGINEERING RESEARCH LAB., U. OF ILLINOIS, URBANA.
((STATISTICAL ANALYSIS, *MATHEMATICAL LOGIC, CURVE FITTING, CONSTRUCTION, SCHEDULING,) (*MANAGEMENT ENGINEERING, *OPERATIONS RESEARCH, PRODUCTION, PROGRAMMING,)

AD-273 300 62-2-5 DIV. 30
GRUMMAN AIRCRAFT ENGINEERING CORP., BETHPAGE, N. Y.
((ABSTRACT) *THEORY OF EFFECTIVENESS OF (COMPUTABLE) *FUNCTIONS,) (AUTOMATION, STATISTICAL ANALYSIS (DECISION THEORY), *MATHEMATICAL LOGIC, *METAMATHEMATICS, MATRIX ALGEBRA, ANALYSIS (RECURSIVE),) (RECURSIVE FUNCTIONS) COMPUTERS,)

***MATRIX ALGEBRA**

AD-273 122 62-2-5 DIV. 6
CASE INST. OF TECH., CLEVELAND, OHIO.
((ELECTRICAL NETWORKS, THEORY, TRANSFORMATIONS (MATHEMATICS), *MATRIX ALGEBRA,)

***MECHANICAL PROPERTIES**

AD-273 250 62-2-5 DIV. 25
MARTIN CO., BALTIMORE, MD.
((LOW PRESSURE RESEARCH, *METALS, FATIGUE (MECHANICS), CREEP, *MECHANICAL PROPERTIES, TENSILE PROPERTIES, SPACE ENVIRONMENTAL CONDITIONS,) (LABORATORY EQUIPMENT, VACUUM APPARATUS, DESIGN,) (SPACESHIPS, SATELLITE VEHICLES, MATERIALS, SINGLE CRYSTALS, METALLIC CRYSTALS, HEAT RESISTANT ALLOYS, REFRACTORY MATERIALS, ALLOYS, ALUMINUM,)

***MELTING**

AD-273 281 62-2-5 DIV. 26
WESTINGHOUSE ELECTRIC CORP., BLAIRSVILLE, PA.
((AIR FORCE RESEARCH, *TEST FACILITIES, *VACUUM FURNACES, ELECTRIC ARCS, DESIGN, OPERATION,) (ALLOYS, METALS, *MELTING, GRAINS (METALLURGY), CRYSTAL STRUCTURE,) ELECTRODES, STEEL, MOLYBDENUM ALLOYS, TITANIUM ALLOYS,)

***METAL COATINGS**

AD-273 119 62-2-5 DIV. 17
ARMOUR RESEARCH FOUNDATION, CHICAGO, ILL.
((ALLOYS, HEAT RESISTANT ALLOYS, HIGH TEMPERATURE RESEARCH, *VANADIUM ALLOYS, TITANIUM ALLOYS, NIOBIUM ALLOYS, COATINGS, *ANTIOXIDANTS, OXIDATION INHIBITORS, **METAL COATINGS, NICKEL PLATING, *CERAMIC COATINGS, SILICON COATINGS,) (FLAME SPRAYING, ELECTRODEPOSITION, INTERMETALLIC COMPOUNDS, NICKEL COMPOUNDS, YTTRIUM COMPOUNDS, OXIDES, BORON COMPOUNDS, SILICIDES,) (TESTS, MECHANICAL PROPERTIES, DEFORMATION, TENSILE PROPERTIES)

***METALS**

AD-273 010 62-2-5 DIV. 17
CASE INST. OF TECH., CLEVELAND, OHIO.
((METALLIC CRYSTALS, *METALS, MAGNESIUM, CADMIUM, ZINC,) (SINGLE CRYSTALS, *ALLOYS, TIN ALLOYS, SILVER ALLOYS, MAGNESIUM ALLOYS,) (MAGNETIC SUSCEPTIBILITY, HALL EFFECT, ELECTROMAGNETIC PROPERTIES, RESISTANCE,) LOW TEMPERATURE RESEARCH, CRYSTAL STRUCTURE, LATTICES, SURFACES, MAGNETIC FIELDS, ELECTRIC CURRENTS, CYCLOTRONS, SOLID STATE PHYSICS.

AD-273 065 62-2-5 DIV. 14
GENERAL DYNAMICS/ASTRONAUTICS, SAN DIEGO, CALIF.
((ALLOYS, *METALS, *PLASTICS, EXPANDED PLASTICS, *GLASS TEXTILES, LAMINATES, SHEETS, METAL PLATES, TITANIUM, *TITANIUM ALLOYS, *ALUMINUM ALLOYS, *STAINLESS STEEL, *STEEL, *NICKEL ALLOYS,) (LOW TEMPERATURE RESEARCH, CRYOGENICS, MECHANICAL PROPERTIES, PHYSICAL PROPERTIES, FATIGUE (MECHANICS), CORROSION,) (MARTENSITE, X-RAY DIFFRACTION ANALYSIS,) (THERMAL EXPANSION, MEASUREMENT)

AD-273 179 62-2-5 DIV. 26
CHANCE VOUGHT CORP., DALLAS, TEX.
((ALLOYS, *METALS, *SHEETS, PIPES, CYLINDRICAL BODIES, *PROCESSING, TOOLS, DIES, DESIGN, ANALYSIS,) (DEFORMATION, EXPLOSIVE FORMING, METAL FORMING PRESSES, METAL PLATES, HYDROSTATIC PRESSURE, ELECTROMAGNETISM, HYDRAULIC PRESSES,) BERYLLIUM, STAINLESS STEEL, TITANIUM ALLOYS, TOOL STEEL, TUNGSTEN, CHROMIUM ALLOYS, ALUMINUM ALLOYS, MOLYBDENUM ALLOYS, NICKEL ALLOYS, COBALT ALLOYS, NIOBIUM ALLOYS, VANADIUM ALLOYS, SOLID STATE PHYSICS, SOLIDS, LIQUIDS, GASES, INDUSTRIAL PRODUCTION, HANDBOOKS,

AD-273 184 62-2-5 DIV. 17
DEFENSE METALS INFORMATION CENTER, COLUMBUS, OHIO.
((*BIBLIOGRAPHY, *HEAT RESISTANT

ALLOYS. *METALS. *CERAMIC MATERIALS. *REFRACTORY MATERIALS. ALLOYS.) (STAINLESS STEEL. STEEL. IRON ALLOYS. NICKEL ALLOYS. BERYLLIUM, TITANIUM. MAGNESIUM. *COBIUM. CHROMIUM. MOLYBDENUM. TANTALUM. VANADIUM. TUNGSTEN.) COATINGS.

AD-273 250 62-2-5 DIV. 25
MARTIN CO., BALTIMORE, MD.
(LOW PRESSURE RESEARCH. *METALS. FATIGUE (MECHANICS). CREEP. *MECHANICAL PROPERTIES. TENSILE PROPERTIES. SPACE ENVIRONMENTAL CONDITIONS.) (LABORATORY EQUIPMENT. VACUUM APPARATUS. DESIGN.) (SPACESHIPS. SATELLITE VEHICLES. MATERIALS. SINGLE CRYSTALS. METALLIC CRYSTALS. HEAT RESISTANT ALLOYS. REFRACTORY MATERIALS. ALLOYS. ALUMINUM.)

AD-273 292 62-2-5 DIV. 17
DYNAMICS PROPERTIES LAB., CALIF. INST. OF TECH, PASADENA.
(*METALS. *FRACTURE (MECHANIC). ELASTICITY. PLASTICITY. *PLASTIC FLOW. DEFORMATION. GRAINS (METALLURGY.) (STEEL. ZINC. SINGLE CRYSTALS.) BRITTLE MATERIALS.

AD-273 410 62-2-5 DIV. 17
FOREIGN TECH. DIV., AIR FORCE SYSTEMS COMMAND. WRIGHT-PATTERSON AIR FORCE BASE, OHIO.
(*ALLOYS. *METALS. *HEATING IN *ELECTROLYTES BY ELECTRIC CURRENTS OR ELECTIC POTENTIAL. TEXTBOOKS.) (INDUSTRIAL EQUIPMENT, AUTOMATION. INDUSTRIAL PLANTS. USSR.) (HARDENING. SOLDERING. WELDING. METAL FORMING PRESSES.)

***METAMATHEMATICS**

AD-273 300 62-2-5 DIV. 30
GRUMMAN AIRCRAFT ENGINEERING CORP., BETHPAGE, N. Y.
((ABSTRACT) *THEORY OF EFFECTIVENESS OF (COMPUTABLE) *FUNCTIONS.) (*AUTOMATION, STATISTICAL ANALYSIS (DECISION THEORY). *MATHEMATICAL LOGIC. *METAMATHEMATICS. MATRIX ALGEBRA. ANALYSIS (RECURSIVE). (RECURSIVE FUNCTIONS) COMPUTERS.)

***METEORITES**

AD-273 236 62-2-5 DIV. 25
LITTLE, ARTHUR D., INC., CAMBRIDGE, MASS.
(*METEORITES. SATELLITE VEHICLES. (*PELLETS. *HYPERVELOCITY PROJECTILES. *IMPACT SHOCK. DYNAMICS. PARTICLES.)

***METEOROLOGICAL BALLOONS**

AD-273 071 62-2-5 DIV. 1
KAYSAM CORP. OF AMERICA, PATTERSON, N. J.
(*BALLOONS. *METEOROLOGICAL BALLOONS. MATERIALS. *BUOYANT MATERIALS. FILMS. CONFIGURATION. AERODYNAMIC CONFIGURATIONS. RADIATION EFFECTS.) (POLYMERS. SYNTHETIC RUBBER. PLASTICIZERS. CATALYSTS. REINFORCING MATERIALS.) (TESTS. PHYSICAL PROPERTIES. MECHANICAL PROPERTIES. TENSILE PROPERTIES. ELASTICITY. ULTRAVIOLET RADIATION. OZONE.) (FLIGHT TESTING. HIGH ALTITUDE.)

***METEOROLOGICAL DATA**

AD-273 303 62-2-5 DIV. 2
AIR FORCE CAMBRIDGE RESEARCH LABS., BEDFORD, MASS.
(*RADIOSONDES. BALLOONS. *METEOROLOGICAL DATA. TABLES. DRIFT.)

***METEORS**

AD-273 021 62-2-5 DIV. 2
SASKATCHEWAN U. (CANADA).
(RADIO SIGNALS. *IONOSPHERIC PROPAGATION. *METEORS. WAKE. DETECTION. *RADAR ECHO AREAS. REFLECTION. ULTRA HIGH FREQUENCY.)

***MICA CAPACITORS**

AD-273 170 62-2-5 DIV. 8
GENERAL ELECTRIC CO., OWENSBORO, KY.
(*ELECTRONIC CIRCUITS. HIGH TEMPERATURE RESEARCH. THERMIONIC EMISSION. RADIATION DAMAGE.) (CIRCUITS. *ELECTRON TUBES. *DIODES. TRIODES. ELECTRICAL PROPERTIES. MECHANICAL PROPERTIES. PROCESSING. MATERIALS. SHOCK RESISTANCE. LIFE EXPECTANCY. TITANIUM.) (*RESISTORS. *CARBON RESISTORS. MATERIALS. TUNGSTEN. MOLYBDENUM. LIFE EXPECTANCY.) (*CAPACITORS. MATERIALS. DIELECTRICS. CERAMIC MATERIALS. *VARIABLE CAPACITORS. *MICA CAPACITORS.) TEST EQUIPMENT.

***MICROBAROMETRIC WAVES**

AD-273 327 62-2-5 DIV. 2
SANDIA LAB., ALBUQUERQUE, N. MEX.
(*UNDERGROUND EXPLOSIONS. *NUCLEAR EXPLOSIONS. *MICROBAROMETRIC WAVES. MEASUREMENT. METEOROLOGY.) MICROBAROMETERS

***MICROMETEOROLOGY**

AD-273 053 62-2-5 DIV. 2
*WISCONSIN U., MADISON.
(*MICROMETEOROLOGY. TERRAIN. TURBULENT BOUNDARY LAYER. ATMOSPHERE. HEAT TRANSFER.) (EARTH. SURFACE PROPERTIES. CLIMATIC FACTORS. SOILS.)

***MICROWAVE AMPLIFIERS**

AD-273 077 62-2-5 DIV. 8
ELECTRON PHYSICS LAB., U. OF MICHIGAN, ANN ARBOR.
(*ELECTRON GUNS. ELECTROMAGNETIC FIELDS. MICROWAVES.) (*ELECTRON BEAMS. NOISE (RADIO). SPACE CHARGES. MATHEMATICAL ANALYSIS. NUMERICAL METHODS AND PROCEDURES.) (*MICROWAVE AMPLIFIERS. S BAND. TESTS. MEASUREMENT.) (ELECTRONS. DENSITY. PROPAGATION.) NONLINEAR SYSTEMS. NOISE ANALYZERS.

***MICROWAVE EQUIPMENT**

AD-273 113 62-2-5 DIV. 6
ANTENNA LAB., OHIO STATE U. RESEARCH FOUNDATION, COLUMBUS.
(DETECTORS. *MICROWAVE EQUIPMENT. *OPTICAL EQUIPMENT. *MAGNETO-OPTIC ROTATION. *PARAMAGNETIC CRYSTALS. MAGNETIC FIELDS. CRYSTAL DETECTORS. LATTICES. NUCLEAR SPINS. CRYSTAL STRUCTURE. RELAXATION TIME. SUPERREGENERATION. THEORY. DESIGN. SENSITIVITY.) (ELECTROMAGNETIC WAVES. *MICROWAVES. RESONANCE ABSORPTION. *LIGHT. MODULATION. RADIOFREQUENCY POWER. DETECTION.)

***MICROWAVE NETWORKS**

AD-273 123 62-2-5 DIV. 8
AIRBORNE INSTRUMENTS LAB., INC., DEER PARK, LONG ISLAND, N. Y.
(*MICROWAVES. *RADIO TRANSMITTERS. MEASUREMENT. *DIPOLE ANTENNAS. CIRCUITS. ELECTRIC FIELDS. *WAVEGUIDES. TRANSMISSION LINES. *MICROWAVE NETWORKS.)

***MICROWAVE PROBES**

AD-273 272 62-2-5 DIV. 8
AIRBORNE INSTRUMENTS LAB., INC., DEER PARK, LONG ISLAND, N. Y.
(*RADAR TRANSMITTERS. *RADIO TRANSMITTERS. MICROWAVE FREQUENCY. *RADIOFREQUENCY POWER. MEASUREMENT BY *WAVEMETERS. *MICROWAVE PROBES IN *WAVEGUIDES. ANTENNA HORNS.) (*ELECTROMAGNETIC WAVES. TEST EQUIPMENT. WAVE CHARACTERISTICS. *MICROWAVES. ELECTRIC FIELDS. TRANSMISSION LINES. TESTS. MATHEMATICAL ANALYSIS.)

***MICROWAVE SPECTROSCOPY**

AD-273 029 62-2-5 DIV. 8
ELECTRICAL ENGINEERING RESEARCH LAB., U. OF TEXAS, AUSTIN.
(*MICROWAVE SPECTROSCOPY. INSTRUMENTATION. TESTS. OXYGEN.) (*RADIOMETERS. ATMOSPHERIC REFRACTION. EXTREMELY HIGH FREQUENCY. *MICROWAVES. HIGH ALTITUDE. PROPAGATION.)

AD-273 075 62-2-5 DIV. 8
RESEARCH LAB. OF ELECTRONICS, MASS. INST. OF TECH., CAMBRIDGE.
(*ELECTRONICS. X-RAY SPECTROSCOPY. PHYSICAL CHEMISTRY. THERMODYNAMICS. MICROWAVE SPECTROSCOPY. MASERS. NUCLEAR MAGNETIC RESONANCE. MICROWAVES. MOLECULAR BEAMS. RADIO ASTRONOMY. *PLASMA PHYSICS. MAGNETOHYDRODYNAMICS. *COMMUNICATIONS THEORY. LANGUAGES. NEUROLOGY. SPEECH.)

***MICROWAVES**

AD-273 003 62-2-5 DIV. 25
MICROWAVE LAB., STANFORD U., CALIF.
(FEASIBILITY STUDIES OF *WAVE FORM GENERATORS. *MICROWAVES. MAGNETIC FIELDS. RESONANCE ABSORPTION. SOLID STATE PHYSICS.) (ELECTROMAGNETIC WAVES. SHOCK WAVES IN *FERROMAGNETIC MATERIALS. SINGLE CRYSTALS. *FERRITES. DIELECTRICS.) (PARTIAL DIFFERENTIAL EQUATIONS. HARMONIC ANALYSIS. PERTURBATION THEORY.) X-RAY DIFFRACTION ANALYSIS.

AD-273 029 62-2-5 DIV. 8
ELECTRICAL ENGINEERING RESEARCH LAB., U. OF TEXAS, AUSTIN.
(*MICROWAVE SPECTROSCOPY. INSTRUMENTATION. TESTS. OXYGEN.) (*RADIOMETERS. ATMOSPHERIC REFRACTION. EXTREMELY HIGH FREQUENCY. *MICROWAVES. HIGH ALTITUDE. PROPAGATION.)

AD-273 113 62-2-5 DIV. 6
ANTENNA LAB., OHIO STATE U. RESEARCH FOUNDATION, COLUMBUS.
(DETECTORS. *MICROWAVE EQUIPMENT. *OPTICAL EQUIPMENT. *MAGNETO-OPTIC ROTATION. *PARAMAGNETIC CRYSTALS. MAGNETIC FIELDS. CRYSTAL DETECTORS. LATTICES. NUCLEAR SPINS. CRYSTAL STRUCTURE. RELAXATION TIME. SUPERREGENERATION. THEORY. DESIGN. SENSITIVITY.) (ELECTROMAGNETIC WAVES. *MICROWAVES. RESONANCE ABSORPTION. *LIGHT. MODULATION. RADIOFREQUENCY POWER. DETECTION.)

AD-273 123 62-2-5 DIV. 8
AIRBORNE INSTRUMENTS LAB., INC., DEER PARK, LONG ISLAND, N. Y.
(*MICROWAVES. *RADIO TRANSMITTERS. MEASUREMENT. *DIPOLE ANTENNAS. CIRCUITS. ELECTRIC FIELDS. *WAVEGUIDES. TRANSMISSION LINES. *MICROWAVE NETWORKS.)

AD-273 245 62-2-5 DIV. 8
MICROWAVE LAB., STANFORD U., CALIF.
(*MICROWAVES. MICROWAVE FREQUENCY. *THEORY. *OPTICS. FREQUENCY. *MASERS. INFRARED RADIATION.) MATERIALS.

AD-273 257 62-2-5 DIV. 8
NAVAL RESEARCH LAB., WASHINGTON, D. C.
(*MICROWAVES. *PROPAGATION. *SCATTERING. PACIFIC OCEAN.) (X BAND. S BAND.)

AD-273 272 62-2-5 DIV. 8
AIRBORNE INSTRUMENTS LAB., INC., DEER PARK, LONG ISLAND, N. Y.
(*RADAR TRANSMITTERS. *RADIO TRANSMITTERS. MICROWAVE FREQUENCY. *RADIOFREQUENCY POWER. MEASUREMENT BY *WAVEMETERS. *MICROWAVE PROBES IN *WAVEGUIDES. ANTENNA HORNS.) (*ELECTROMAGNETIC WAVES. TEST EQUIPMENT. WAVE CHARACTERISTICS. *MICROWAVES. ELECTRIC FIELDS. TRANSMISSION LINES. TESTS. MATHEMATICAL ANALYSIS.)

AD-273 415 62-2-5 DIV. 8
ELECTRICAL ENGINEERING RESEARCH LAB., U. OF ILLINOIS, URBANA.
(*RADIOFREQUENCY GENERATORS. *MICROWAVES. *ELECTROMAGNETIC WAVES. MICROWAVE FREQUENCY. WAVE TRANSMISSION.) (ELECTRON BEAMS. *FREQUENCY MULTIPLIERS. FREQUENCY SHIFT. *CERENKOV RADIATION. *BREMSSTRAHLUNG.) ELECTRONS. PLASMA PHYSICS. DIELECTRICS. *WAVEGUIDES.

***MILITARY AIRCRAFT**

AD-273 050 62-2-5 DIV. 1
PRINCETON U., N. J.
(*MILITARY AIRCRAFT. *MILITARY RESEARCH. *SCIENTIFIC RESEARCH. RESEARCH PROGRAM ADMINISTRATION.) (*VERTICAL TAKE-OFF PLANES. SHORT TAKE-OFF PLANES. *FLYING PLATFORMS. HELICOPTERS. GROUND EFFECT. STABILITY. CONTROL. MODEL TESTS. THEORY. MATHEMATICAL ANALYSIS.) (AIRCRAFT. AIRPLANES. ELECTRICAL PROPERTIES. THEORY.) (TEST FACILITIES. WIND TUNNELS. DESIGN.) *BIBLIOGRAPHY.

***MILITARY RESEARCH**

AD-273 050 62-2-5 DIV. 1
PRINCETON U., N. J.
(*MILITARY AIRCRAFT. *MILITARY RESEARCH. *SCIENTIFIC RESEARCH. RESEARCH PROGRAM ADMINISTRATION.) (*VERTICAL TAKE-OFF PLANES. SHORT TAKE-OFF PLANES. *FLYING PLATFORMS. HELICOPTERS. GROUND EFFECT. STABILITY. CONTROL. MODEL TESTS. THEORY. MATHEMATICAL ANALYSIS.) (AIRCRAFT. AIRPLANES. ELECTRICAL PROPERTIES. THEORY.) (TEST FACILITIES. WIND TUNNELS. DESIGN.) *BIBLIOGRAPHY.

AD-273 440 62-2-5 DIV. 30
STANFORD RESEARCH INST., MENLO PARK, CALIF.
(*DATA PROCESSING SYSTEMS. *DATA STORAGE SYSTEMS. *IDENTIFICATION SYSTEMS. PROGRAMMING. AUTOMATIC TRAINING DEVICES. TEACHING MACHINES. INDEXES. CODING. DOCUMENTATION.) (*MILITARY RESEARCH. *COMPUTER LOGIC. *DIGITAL COMPUTERS.) (TOPOLOGY. AERIAL PHOTOGRAPHY. MAPS. VIDEO NETWORKS.) (EXPERIMENTAL DATA. TABLES. FEASIBILITY STUDIES.) (TRANSFORMATIONS (MATHEMATICS). MATRIX ALGEBRA.)

***MINERAL OILS**

AD-273 240 62-2-5 DIV. 6
MOTOROLA, INC., RIVERSIDE, CALIF.
(LIGHT PULSES. *SPARKS. *ELECTRIC ARCS. *MINERAL OILS. DESIGN. ILLUMINATION.)

***MINERALS**

AD-273 078 62-2-5 DIV. 2
MASSACHUSETTS INST. OF TECH., CAMBRIDGE.
(METEORITES. *MINERALS. *GEOCHEMISTRY. *ISOTOPES. RADIOACTIVE ISOTOPES. *STRONTIUM. *RUBIDIUM. AUSTRALIA. INDOCHINA INDONESIA. PHILIPPINE ISLANDS. NORTH AMERICA. CZECHOSLOVAKIA.) CHEMICAL ANALYSIS. MASS SPECTROSCOPY. X-RAY SPECTROSCOPY. FLUORESCENCE.

***MINIATURE ELECTRONIC EQUIPMENT**

AD-273 133 62-2-5 DIV. 19
LABORATORY FOR ELECTRONICS, INC., BOSTON, MASS.

(*MINIATURE ELECTRONIC EQUIPMENT* MOBILE* *AIR TRAFFIC CONTROL SYSTEMS* *COMMUNICATION EQUIPMENT* RADIO NAVIGATION TRAILERS.) (*RADIO COMMUNICATION SYSTEMS* TELETYPE EQUIPMENT* TRANSMITTER RECEIVERS* FACSIMILE RECEIVER CONVERTERS* FACSIMILE RECORDING SYSTEMS* MICROWAVE RELAY SYSTEMS* RADIO RELAY SYSTEMS* ULTRA HIGH FREQUENCY* VERY HIGH FREQUENCY* REDUCTION* PACKAGING* RELIABILITY.)

***MOLYBDENUM ALLOYS**

AD-273 040 62-2-5 DIV. 17
UNIVERSAL-CYCLOPS STEEL CORP., BRIDGEVILLE, PA.
(PROCESSING, *SHEETS, *MOLYBDENUM ALLOYS, TITANIUM ALLOYS AND ZIRCONIUM ALLOYS (TZM), MELTING, CASTING, FORGING, EXTRUSION, ROLLING MILLS, HEAT TREATMENT.) (MICROSTRUCTURE, GRAINS (METALLURGY), CARBIDES, TRANSITION TEMPERATURE, TENSILE PROPERTIES, DEFORMATION, TESTS.)

AD-273 057 62-2-5 DIV. 20
ALLEGHENY LUDLUM STEEL CORP., BRACKENRIDGE, PA.
(*EXTRUSION, FORGING, *MOLYBDENUM ALLOYS (TZM), TITANIUM ALLOYS, ZIRCONIUM ALLOYS.) (SURFACE PROPERTIES, MICROSTRUCTURE, HARDNESS, TENSILE PROPERTIES.) (METAL FORMING PRESSES, HEATING, DIES, COATINGS, FLAME SPRAYING, ZIRCONIUM COMPOUNDS, OXIDES, LUBRICATION.)

AD-273 142 62-2-5 DIV. 17
NEW ENGLAND MATERIALS LAB., INC., MEDFORD, MASS.
(HEAT RESISTANT ALLOYS, *REFRACTORY MATERIALS, *DISPERSION HARDENING, OXIDATION, POWDER ALLOYS, POWDER METALS, *MOLYBDENUM ALLOYS, TITANIUM ALLOYS.) (MOLYBDENUM COMPOUNDS, TITANIUM COMPOUNDS, OXIDES, OXIDES, SINTERING, DIFFUSION.) ALLOYS, METALS.

***MOON**

AD-273 136 62-2-5 DIV. 12
LOCKHEED AIRCRAFT CORP., SUNNYVALE, CALIF.
(*BIBLIOGRAPHY, *MOON,) (LUNAR PROBES, MANNED SPACESHIPS, CLOSED-CYCLE ECOLOGICAL SYSTEMS, TRANSPORTATION, EXTRATERRESTRIAL BASES, PLANETS, ARCTIC REGIONS, EXPLORATION, GEOLOGY, LOGISTICS, FROSTBITE, SATELLITE VEHICLES, SPACE CAPSULES, PERMAFROST.)

AD-273 310 62-2-5 DIV. 2
GEOPHYSICS CORP. OF AMERICA, BEDFORD, MASS.
(*MOON, SURFACE PROPERTIES, BRIGHTNESS, LIGHT, NAVIGATION, *SPACE NAVIGATION,) (MEASUREMENT OF BRIGHTNESS OF MOON WITH PHOTOMETERS.) ASTRONOMY.

***MOTION**

AD-273 154 62-2-5 DIV. 2
NORTHWESTERN U., EVANSTON, ILL.
(*STARS, *MOTION, MEASUREMENT RECORDING DEVICES.)

***MOTOR GENERATORS**

AD-273 286 62-2-5 DIV. 7
ARINC RESEARCH CORP., WASHINGTON, D. C.
(*ELECTRICAL EQUIPMENT, MILITARY EQUIPMENT, *RELIABILITY, MATHEMATICAL PREDICTION,) (*ELECTRIC MOTORS, ALTERNATING CURRENT, DIRECT CURRENT, SYNCHRO RECEIVERS, *MOTOR GENERATORS, *SERVO MOTORS, *SYNCHROS, *FAILURE (MECHANICS), AIRBORNE, SHIPBORNE, BEARINGS, LUBRICATION, BRUSHES, ANALYSIS.)

***MULTIPATH TRANSMISSION**

AD-273 198 62-2-5 DIV. 5
ROME AIR DEVELOPMENT CENTER, GRIFFISS AIR FORCE BASE, N. Y.
(*AIR FORCE COMMUNICATIONS, *RADIO COMMUNICATION SYSTEMS, RADIO ANTI-JAMMING, CORRELATION TECHNIQUES, DIVERSITY SYSTEMS,) (*RADIO TRANSMISSION, *MULTIPATH TRANSMISSION, MODULATION, SIGNAL-TO-NOISE RATIO, THEORY.) (RADIO RECEIVERS, RADIO TRANSMITTERS, SIDEBANDS.)

***NAVAL EQUIPMENT**

AD-273 148 62-2-5 DIV. 30
PANORAMIC RADIO PRODUCTS, INC., MOUNT VERNON, N. Y.
(*RADIOFREQUENCY SPECTRUM ANALYZERS, HIGH FREQUENCY, *SIGNAL GENERATORS, AUDIOFREQUENCY, *TEST SETS, DESIGN,) (SIDEBANDS, RADIO TRANSMITTERS, TEST EQUIPMENT, TRANSISTORS, *NAVAL EQUIPMENT, SPECIFICATIONS.)

***NEUTRON BEAMS**

AD-273 254 62-2-5 DIV. 20
NAVAL RESEARCH LAB., WASHINGTON, D. C.
(RESEARCH REACTORS, *NEUTRON DIFFRACTION ANALYSIS OF *SINGLE CRYSTALS AND CRYSTAL STRUCTURE, MAGNETIC PROPERTIES,) (AUTOMATION, DIGITAL COMPUTERS, PROGRAMMING) (*NEUTRON BEAMS, MONOCHROMATIC LIGHT, DIFFRACTION GRATINGS, OPTICAL EQUIPMENT,)

AD-273 279 62-2-5 DIV. 20
WATERTOWN ARSENAL LABS., MASS.
(*THERMAL NEUTRONS, *NEUTRON BEAMS, *RADIOGRAPHY, INDUSTRIAL RADIOGRAPHY, ORDNANCE MATERIALS,) FEASIBILITY STUDIES.

***NEUTRON BOMBARDMENT**

AD-273 169 62-2-5 DIV. 20
GENERAL DYNAMICS/ASTRONAUTICS, SAN DIEGO, CALIF.
(*NEUTRON BOMBARDMENT OF *BERYLLIUM, REFLECTORS, HELIUM,) (BERYLLIUM, MECHANICAL PROPERTIES, TEMPERATURE, TENSILE PROPERTIES, ELASTICITY, DENSITY, THERMODYNAMICS, MELTING, BOILING, HEAT OF FUSION, SPECIFIC HEAT, THERMAL CONDUCTIVITY, THERMAL EXPANSION,) (NEUTRON FLUX DENSITY, MASS NUMBER,) (RE-ENTRY AERODYNAMICS, RADIATION EFFECTS, REACTOR REFLECTOR MATERIALS, BERYLLIUM, HAZARDS,)

***NEUTRON DIFFRACTION ANALYSIS**

AD-273 254 62-2-5 DIV. 20
NAVAL RESEARCH LAB., WASHINGTON, D. C.
(RESEARCH REACTORS, *NEUTRON DIFFRACTION ANALYSIS OF *SINGLE CRYSTALS AND CRYSTAL STRUCTURE, MAGNETIC PROPERTIES,) (AUTOMATION, DIGITAL COMPUTERS, PROGRAMMING) (*NEUTRON BEAMS, MONOCHROMATIC LIGHT, DIFFRACTION GRATINGS, OPTICAL EQUIPMENT,)

***NICKEL ALLOYS**

AD-273 065 62-2-5 DIV. 14
GENERAL DYNAMICS/ASTRONAUTICS, SAN DIEGO, CALIF.
(*ALLOYS, *METALS, *PLASTICS, EXPANDED PLASTICS, *GLASS TEXTILES, LAMINATES, SHEETS, METAL PLATES, TITANIUM, *TITANIUM ALLOYS, *ALUMINUM ALLOYS, *STAINLESS STEEL, *STEEL, *NICKEL ALLOYS,) (LOW TEMPERATURE RESEARCH, CRYOGENICS, MECHANICAL PROPERTIES, PHYSICAL PROPERTIES, FATIGUE (MECHANICS), CORROSION,) (MARTENSITE, X-RAY DIFFRACTION ANALYSIS,) (THERMAL EXPANSION, MEASUREMENT)

AD-273 314 62-2-5 DIV. 17
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION, WASHINGTON, D. C.
(ALLOYS, METALS, OXIDES, *DISPERSION HARDENING OF *NICKEL ALLOYS WITH *MAGNESIUM COMPOUNDS, MIXTURES, BALL MILLS, POWDER METALS, POWDER METALLURGY, PROCESSING, SINTERING, EXTRUSION,) METAL FORMING PRESSES, DENSITY, CHEMICAL IMPURITIES.

AD-273 418 62-2-5 DIV. 20
GENERAL DYNAMICS/FORT WORTH, TEX.
(*RADIATION EFFECTS, X-RAYS, GAMMA RAYS, ALPHA PARTICLES, NEUTRONS, BETA PARTICLES, MATERIALS, METALS, SEMICONDUCTORS, OPTICAL MATERIALS, GLASS, PLASTICS, ELASTOMERS, ORGANIC MATERIALS, INORGANIC SUBSTANCES, ELECTRICAL EQUIPMENT, ELECTRONIC EQUIPMENT, ELECTRIC INSULATION,) (NUCLEAR REACTIONS, *STEEL, *ALUMINUM ALLOYS, *COPPER ALLOYS, *NICKEL ALLOYS, ALLOYS,) (RADIOBIOLOGY, *RADIATION HAZARDS, DOSAGE,) (AIRCRAFT, NUCLEAR PROPULSION,)

***NIOBIUM**

AD-273 213 62-2-5 DIV. 17
CENTRAL INST. FOR INDUSTRIAL RESEARCH (NORWAY).
(PHASE STUDIES, METALLIC COMPOUNDS, OXIDES, *NIOBIUM, *TANTALUM, NIOBIUM COMPOUNDS, TANTALUM COMPOUNDS, OXYGEN, *OXIDATION, X-RAY DIFFRACTION ANALYSIS,) (METALS, CRYSTAL STRUCTURE, LATTICES, PHASE TRANSITIONS.)

AD-273 216 62-2-5 DIV. 17
CENTRAL INST. FOR INDUSTRIAL RESEARCH (NORWAY).
(*NIOBIUM, *TANTALUM, HIGH TEMPERATURE RESEARCH, OXIDATION, *PHASE STUDIES, NIOBIUM COMPOUNDS, TANTALUM COMPOUNDS, OXIDES, X-RAY DIFFRACTION ANALYSIS, ELECTRON DIFFRACTION ANALYSIS, *MICROSTRUCTURE, SHEETS, POWDER METALS,)

AD-273 232 62-2-5 DIV. 17
ILLINOIS U., URBANA.
(METALS, *NIOBIUM, GASES, *NITROGEN, *PHASE STUDIES, THERMODYNAMICS, PRESSURE, TEMPERATURE,) (HEAT OF FORMATION, HEAT OF SOLUTION, SOLIDS, SOLUTIONS, SOLUBILITY, BLACKBODY RADIATION, DATA,) (X-RAY DIFFRACTION ANALYSIS, MICROSCOPY, LATTICES, PRECIPITATION, INTERNAL FRICTION, HIGH TEMPERATURE RESEARCH,) SOLID STATE PHYSICS, METALLURGY.

***NITRATION**

AD-273 125 62-2-5 DIV. 4
FELTMAN RESEARCH LABS., PICATINNY ARSENAL, DOVER, N. J.
(CHEMICAL REACTIONS, PHOTOCHEMISTRY, *PHOTOCHEMICAL REACTIONS, *NITRATION OF BENZENES AND *NITROBENZENES BY NITROGEN COMPOUNDS AND DIOXIDES, LIGHT, ULTRAVIOLET RADIATION,) ULTRAVIOLET SPECTROSCOPY, USSR.

***NITROBENZENES**

AD-273 125 62-2-5 DIV. 4
FELTMAN RESEARCH LABS., PICATINNY ARSENAL, DOVER, N. J.
(CHEMICAL REACTIONS, PHOTOCHEMISTRY, *PHOTOCHEMICAL REACTIONS, *NITRATION OF BENZENES AND *NITROBENZENES BY NITROGEN COMPOUNDS AND DIOXIDES, LIGHT, ULTRAVIOLET RADIATION,) ULTRAVIOLET SPECTROSCOPY, USSR.

***NITROGEN**

AD-273 102 62-2-5 DIV. 25
CORNELL AERONAUTICAL LAB., INC., BUFFALO, N. Y.
(*AERODYNAMIC HEATING, SHOCK WAVES, GASES, *NITROGEN, INFRARED SPECTROSCOPY, *ELECTRON TRANSITIONS, THEORY, QUANTUM MECHANICS,) (HIGH TEMPERATURE RESEARCH, AIR, SPECTROGRAPHIC ANALYSIS, RE-ENTRY AERODYNAMICS,)

AD-273 103 62-2-5 DIV. 9
CORNELL AERONAUTICAL LAB., INC., BUFFALO, N. Y.
(*RE-ENTRY AERODYNAMICS, *AERODYNAMIC HEATING, GASES, *NITROGEN, *OXYGEN, VIBRATION, *DISSOCIATION, RELAXATION TIME, REACTION KINETICS, THEORY,)

AD-273 232 62-2-5 DIV. 17
ILLINOIS U., URBANA.
(METALS, *NIOBIUM, GASES, *NITROGEN, *PHASE STUDIES, THERMODYNAMICS, PRESSURE, TEMPERATURE,) (HEAT OF FORMATION, HEAT OF SOLUTION, SOLIDS, SOLUTIONS, SOLUBILITY, BLACKBODY RADIATION, DATA,) (X-RAY DIFFRACTION ANALYSIS, MICROSCOPY, LATTICES, PRECIPITATION, INTERNAL FRICTION, HIGH TEMPERATURE RESEARCH,) SOLID STATE PHYSICS, METALLURGY.

***NOISE**

AD-273 248 62-2-5 DIV. 25
MINNESOTA U., MINNEAPOLIS.
(*GAS DISCHARGES, *NOISE, THEORY,) (*PLASMA PHYSICS, GAS IONIZATION, ELECTROMAGNETIC WAVES, LOW FREQUENCY, HIGH FREQUENCY, TEMPERATURE,) (TEST METHODS, TEST EQUIPMENT, DISCHARGE TUBES,)

***NUCLEAR ENERGY**

AD-273 067 62-2-5 DIV. 25
GENERAL MOTORS RESEARCH LABS., WARREN, MICH.
(*NUCLEAR ENERGY, FISSION, FISSION PRODUCTS, *PLASMA PHYSICS, THERMIONIC EMISSION,) (DIODES, RARE GASES, ELECTRONS, *ELECTRIC POWER PRODUCTION,) (CATHODES, CESIUM, *CESIUM ELECTRON TUBES,)

***NUCLEAR EXPLOSIONS**

AD-273 158 62-2-5 DIV. 20
STANFORD RESEARCH INST., MENLO PARK, CALIF.
(*FEASIBILITY STUDIES ON *SIMULATION OF *GROUND EFFECT, MOTION FROM SURFACES OR UNDERGROUND EXPLOSIONS, *NUCLEAR EXPLOSIONS USING NON NUCLEAR EXPLOSIVES,) (GASES, DETONATION, SHOCK WAVES,)

AD-273 327 62-2-5 DIV. 2
SANDIA LAB., ALBUQUERQUE, N. MEX.
(*UNDERGROUND EXPLOSIONS, *NUCLEAR EXPLOSIONS, *MICROBAROMETRIC WAVES, MEASUREMENT, METEOROLOGY,) MICROBAROMETERS

***NUCLEAR POWER PLANTS**

AD-273 244 62-2-5 DIV. 21
MARTIN CO., BALTIMORE, MD.
(*NUCLEAR POWER PLANTS, *HEAT EXCHANGERS, MATERIALS, *CORROSION RESEARCH,) (NICKEL, *NICKEL ALLOYS, COPPER ALLOYS, CHROMIUM ALLOYS, STAINLESS STEEL, STEEL, MOLYBDENUM ALLOYS,) (TESTS, MODEL TESTS, TEST METHODS, CORROSIVE LIQUIDS, STEAM, CHLORIDES,)

AD-273 412 62-2-5 DIV. 20
FOREIGN TECH. DIV., AIR FORCE SYSTEMS COMMAND, *RIGHT-PATTERSON AIR FORCE BASE, OHIO.
(*POWER REACTORS, *SPHERES, PARTICLES, VELOCITY, DIFFUSION, SCATTERING, REFLECTION,) (HETEROGENEOUS REACTORS, *BOILING WATER REACTORS, *NUCLEAR POWER PLANTS, *KINETIC THEORY,) (GRAPHITE, BERYLLIUM, PLUTONIUM COMPOUNDS, STATISTICAL DISTRIBUTIONS, STATISTICAL FUNCTIONS, POLYNOMIALS, FUNCTIONS, INTEGRAL EQUATIONS, NUMERICAL METHODS AND PROCEDURES, TABLES,)

***NUMERICAL ANALYSIS**

AD-273 205 62-2-5 DIV. 9
BALLISTIC RESEARCH LABS., ABERDEEN PROVING

GROUND* MU*
(*SHOCK WAVES* *BLAST* *SPHERES*
TURBULENT FLOW *SPACE CHARGES*) (HYDRO-
DYNAMICS* EQUATIONS* PARTICLES* VELOCITY*)
(PIEZOELECTRIC GAGES* MEASUREMENT*) (*NUMERI-
CAL ANALYSIS* *INTEGRATION* PARTIAL DIFFEREN-
TIAL EQUATIONS*) DIGITAL COMPUTERS*

***NUMERICAL METHODS AND PROCEDURES**

AD-273 207 62-2-5 DIV* 15
BOEING SCIENTIFIC RESEARCH LABS.* SEATTLE*
WASHINGTON*
(STATISTICAL DISTRIBUTIONS*
SCHEDULING PROBABILITY* *NUMERICAL METHODS
AND PROCEDURES* TRANSFORMATIONS (MATHEMATICS)*)

***OCEAN CURRENTS**

AD-273 009 62-2-5 DIV. 2
TEXAS A& AND M. COLL.. COLLEGE STATION.
(VELOCITY. DIRECTION FINDING OF *OCEAN CURRENTS. MEASUREMENT. FLORIDA. *RECORDING DEVICES.) (METERS. DESIGN. CONSTRUCTION. EXPERIMENTAL DATA.)

***OCEANOGRAPHICAL DATA**

AD-273 258 62-2-5 DIV. 2
NAVAL ORDNANCE TEST STATION. CHINA LAKE. CALIF.
(*OCEANOGRAPHY AND OCEAN BOTTOM. ANALYSIS OF *BEACHES ALONG SOUTH CHINA SEA. EGYPT. TAIWAN. KOREA. IRAN. ARABIA. FINLAND AND USSR.) (*GEOGRAPHY. HISTORY. GEOLOGY AND METEOROLOGY.) (METEOROLOGICAL DATA. *OCEANOGAPHICAL DATA AND *SEDIMENTATION.) ANTISUBMARINE &RFARE.

***OCEANOGRAPHY**

AD-273 258 62-2-5 DIV. 2
NAVAL ORDNANCE TEST STATION. CHINA LAKE. CALIF.
(*OCEANOGRAPHY AND OCEAN BOTTOM. ANALYSIS OF *BEACHES ALONG SOUTH CHINA SEA. EGYPT. TAIWAN. KOREA. IRAN. ARABIA. FINLAND AND USSR.) (*GEOGRAPHY. HISTORY. GEOLOGY AND METEOROLOGY.) (METEOROLOGICAL DATA. *OCEANOGAPHICAL DATA AND *SEDIMENTATION.) ANTISUBMARINE &RFARE.

***OCEANS**

AD-273 302 62-2-5 DIV. 2
JOHANNES GUTENBERG-UNIVERSITAET (GERMANY).
(STATISTICAL ANALYSIS OF *HEAT TRANSFER FROM *OCEANS TO *AIR.) (METEOROLOGICAL DATA FROM *EATHER STATIONS ON SHIPS IN ATLANTIC OCEAN.)

***OPERATORS (MATHEMATICS)**

AD-273 025 62-2-5 DIV. 25
MICROWAVE RESEARCH INST.. POLYTECHNIC INST. BROOKLYN. N. Y.
(*ELECTROMAGNETIC THEORY. *QUANTUM MECHANICS.) (*ELECTROMAGNETIC WAVES. *DIFFRACTION. *OPERATORS (MATHEMATICS). *TRANSFORMATIONS (MATHEMATICS). VECTOR ANALYSIS. MATRIX ALGEBRA. ALGEBRA. GREEN'S FUNCTION. PERTURBATION THEORY.)

***OPTICAL EQUIPMENT**

AD-273 002 62-2-5 DIV. 25
SPACE TECHNOLOGY LABS.. INC.. LOS ANGELES. CALIF.
(OPTICS. *OPTICAL EQUIPMENT. THEODOLITES. COLLIMATORS AND REFLECTORS FOR GUIDED MISSILES AND LABORATORIES.) (*INERTIAL GUIDANCE. *INSTRUMENTATION. DESIGN AND TESTS.)

AD-273 113 62-2-5 DIV. 6
ANTENNA LAB.. OHIO STATE U. RESEARCH FOUNDATION. COLUMBUS.
(DETECTORS. *MICROWAVE EQUIPMENT. *OPTICAL EQUIPMENT. *MAGNETO-OPTIC ROTATION. *PARAMAGNETIC CRYSTALS. MAGNETIC FIELDS. CRYSTAL DETECTORS. LATTICES. NUCLEAR SPINS. CRYSTAL STRUCTURE. RELAXATION TIME. SUPERREGENERATION. THEORY. DESIGN. SENSITIVITY.) (ELECTROMAGNETIC WAVES. *MICROWAVES. RESONANCE ABSORPTION. *LIGHT. MODULATION. RADIOFREQUENCY POWER. DETECTION.)

***OPTICAL FILTERS**

AD-273 230 62-2-5 DIV. 16
INDIANA U.. BLOOMINGTON.
(*VISION. *OPTICAL FILTERS. *GOGGLES. EFFECTIVENESS.) (OPHTHALMOLOGY. VISUAL THRESHOLDS. TARGET RECOGNITION.)

***OPTICAL SYSTEMS**

AD-273 085 62-2-5 DIV. 12
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION WASHINGTON. D. C.
(*SPACESHIPS. MANNED. *SPACE NAVIGATION. SPACE FLIGHT. GUIDANCE. AIRBORNE NAVIGATION COMPUTERS. LINEAR SYSTEMS. *OPTICAL SYSTEMS. POSITION FINDING. VELOCITY. FLIGHT PATHS. MATHEMATICAL PREDICTION.) (CELESTIAL MECHANICS. PERTURBATION THEORY. STATISTICAL ANALYSIS. ERRORS. PROBABILITY.) (MOON. ORBITAL FLIGHT PATHS. CONTROL SYSTEMS.)

AD-273 101 62-2-5 DIV. 8
CENTRE DE PHYSIQUE ELECTRONIQUE ET CORPUSCULAIRE (FRANCE).
(*ELECTRON GUNS. *ELECTRON BEAMS. *OPTICAL SYSTEMS. *MAGNETIC FIELDS. NOISE (RADIO). MEASUREMENT. TESTS. TEST EQUIPMENT. THEORY. FRANCE.) MAGNETRONS. CATHODES (ELECTRON TUBES). TEMPERATURE. ELECTRONS. ELECTRODES. ELECTRIC CURRENT. IMPEDANCE. VOLTMETERS. OSCILLOSCOPES. DIODES. SPACE CHARGES.

***OPTICAL TRACKING**

AD-273 273 62-2-5 DIV. 5
PHILCO CORP.. BLUE BELL. PA.
(*LIGHT COMMUNICATION SYSTEMS *OPTICAL TRACKING. COMMUNICATION SYSTEMS. TRACKING. *SATELLITE VEHICLES. *LUNAR PROBES. *SPACESHIPS. COMMUNICATIONS THEORY.) (SATELLITE ATTITUDE. GYROSCOPES. ORBITAL FLIGHT PATHS.) (SATELLITE ATTITUDE. STABILIZATION) (TRACKING WITH THIN FILMS. DETECTORS.) (SATELLITE VEHICLES. ATTITUDES. CONFIGURATION.) SIGNAL-TO-NOISE RATIO. PHOTOMULTIPLIERS.

***OPTICS**

AD-273 245 62-2-5 DIV. 8
MICROWAVE LAB.. STANFORD U.. CALIF.
(*MICROWAVES. MICROWAVE FREQUENCY. *THEORY. *OPTICS. FREQUENCY. *MASERS. INFRARED RADIATION.) MATERIALS.

AD-273 291 62-2-5 DIV. 25
BROWN U.. PROVIDENCE. R. I.
(*OPTICS. *GEOMETRY. SCATTERING. LIGHT. DIFFRACTION. REFLECTION. *WAVE TRANSMISSION IN *DIELECTRICS. CYLINDRICAL ROMIES) (TAYLOR'S SERIES. *WAVE ANALYSIS. FUNCTIONS.)

***ORBITAL FLIGHT PATHS**

AD-273 110 62-2-5 DIV. 9
ROME U. (ITALY).
(*RE-ENTRY VEHICLES. ATMOSPHERE ENTRY. *ORBITAL FLIGHT PATHS. *RE-ENTRY AERODYNAMICS. *TRANSONICS. LIFT. DRAG.) (PERTURBATION THEORY. INTEGRATION.)

AD-273 329 62-2-5 DIV. 12
RAND CORP.. SANTA MONICA. CALIF.
(*SPACE FLIGHT. DYNAMICS. *ORBITAL FLIGHT PATHS. DIGITAL COMPUTERS. MATHEMATICAL ANALYSIS. DIFFERENTIAL EQUATIONS. INTEGRAL EQUATIONS. PARTIAL DIFFERENTIAL EQUATIONS.) (EQUATIONS OF MOTION. OPERATIONS RESEARCH.)

***ORGANOBORANES**

AD-273 266 62-2-5 DIV. 4
RIAS. INC.. BALTIMORE. MD.
(*BORON COMPOUNDS. HYDRIDES. *ORGANOBORANES. *COMPLEX COMPOUNDS. PYRIDINES. *ELECTRON TRANSITIONS. ATOMIC ENERGY LEVELS. QUANTUM MECHANICS.) METALORGANIC COMPOUNDS.

***OXIDATION**

AD-273 213 62-2-5 DIV. 17

CENTRAL INST. FOR INDUSTRIAL RESEARCH (NORWAY).
(OXIDES. *NIOBIUM. *TANTALUM. NIOBIUM COMPOUNDS. TANTALUM COMPOUNDS. OXYGEN. *OXIDATION. X-RAY DIFFRACTION ANALYSIS.) (METALS. CRYSTAL STRUCTURE. LATTICES. PHASE TRANSITIONS.)

AD-273 214 62-2-5 DIV. 17
CENTRAL INST. FOR INDUSTRIAL RESEARCH (NORWAY).
(PHASE STUDIES. *TANTALUM. OXYGEN. *OXIDATION. REACTION KINETICS. SOLUBILITY.) (X-RAY DIFFRACTION ANALYSIS. LATTICES. MICROSTRUCTURE. TANTALUM COMPOUNDS. OXIDES.) (ELECTRON DIFFRACTION ANALYSIS. ELECTRON MICROSCOPY. METALLURGICAL ANALYSIS HARDNESS.)

***OXIDE CATHODES**

AD-273 041 62-2-5 DIV. 8
SPERRY GYROSCOPE CO.. GREAT NECK. N. Y.
(*OXIDE CATHODES. *CATHODES (ELECTRON TUBES). BARIUM COMPOUNDS. OXIDES. RARE EARTHS. IONS. STRONTIUM COMPOUNDS. IMPURITIES. *THERMIONIC EMISSION. *ORK FUNCTIONS. TEMPERATURE. FLUORESCENCE. MEASUREMENT.) (DIODES. ELECTRON TUBES. PHOTOEMISSION. TEST EQUIPMENT. DESIGN.)

***OXIDES**

AD-273 265 62-2-5 DIV. 10
ROCKET POWER. INC.. PASADENA. CALIF.
(*ALUMINUM COMPOUNDS. *OXYFLUORIDES. *OXIDES. FLUORIDES. HEAT OF FORMATION. CHEMICAL REACTIONS. *THERMOCHEMISTRY.) (BORON COMPOUNDS. BORIC ACIDS. CHEMICAL REACTIONS. OXIDES. *ATER.) (SOLID ROCKET PROPELLANTS. ALUMINUM COMPOUNDS. THERMODYNAMICS.)

***OXYCELLULOSE**

AD-273 013 62-2-5 DIV. 4
BRITISH COTTON INDUSTRY RESEARCH ASSOCIATION.
(*OXYCELLULOSE. *POLYMERS. CONDENSATION. CHEMICAL REACTIONS. CARBAZIDES HYDRAZINE DERIVATIVES OF CYANURIC ACID OR PHOSPHONYL RADICALS. NITRILO RADICALS.) (GLUCOSIDES AND ETHANOLS. AMINES OR PHENYL RADICALS. UREA.) (SUBSTITUTION REACTIONS. OXIDATION. PYROLYSIS.) CELLULOSE CHEMISTRY

***OXYFLUORIDES**

AD-273 049 62-2-5 DIV. 4
AEROSPACE CORP.. LOS ANGELES. CALIF.
(*FLUORIDES OR *OXYFLUORIDES *SULFUR COMPOUNDS. *SELENIUM COMPOUNDS. *TELLURIUM COMPOUNDS. SYNTHESIS. CHEMICAL REACTIONS. PHYSICAL PROPERTIES. THERMODYNAMICS. HEAT OF FORMATION.)

AD-273 265 62-2-5 DIV. 10
ROCKET POWER. INC.. PASADENA. CALIF.
(*ALUMINUM COMPOUNDS. *OXYFLUORIDES. *OXIDES. FLUORIDES. HEAT OF FORMATION. CHEMICAL REACTIONS. *THERMOCHEMISTRY.) (BORON COMPOUNDS. BORIC ACIDS. CHEMICAL REACTIONS. OXIDES. *ATER.) (SOLID ROCKET PROPELLANTS. ALUMINUM COMPOUNDS. THERMODYNAMICS.)

***OXYGEN**

AD-273 103 62-2-5 DIV. 9
CORNELL AERONAUTICAL LAB.. INC.. BUFFALO. N. Y.
(*RE-ENTRY AERODYNAMICS. *AERODYNAMIC HEATING. GASES. *NITROGEN. *OXYGEN. VIBRATION. *DISSOCIATION. RELAXATION TIME. REACTION KINETICS. THEORY.)

AD-273 299 62-2-5 DIV. 7
FLORIDA U. ENGINEERING AND INDUSTRIAL EXPERIMENT STATION. GAINESVILLE.
(*FUEL CELLS. POWER SUPPLIES. *HYDROGEN COMPOUNDS. *OXYGEN. *BROMIDES. OXIDATION TO BROMINE. ELECTROLYTIC CELLS. CHEMICAL REACTIONS. CATALYSTS. NITROGEN COMPOUNDS. OXIDES. OXIDATION-REDUCTION REACTIONS.) CHEMICAL ANALYSIS.

***OXYGEN EQUIPMENT**

AD-273 175 62-2-5 DIV. 29
PIONEER-CENTRAL DIV.. BENDIX CORP.. DAVENPORT. IOWA.
(*OXYGEN EQUIPMENT FOR *FLIGHTLESSNESS IN *SPACE ENVIRONMENTAL CONDITIONS.) (PRESSURE BREATHING. LIQUEFIED GASES. OXYGEN.) DESIGN.

***OZONE**

AD-273 182 62-2-5 DIV. 2
COLOGNE U. (GERMANY).
(*OZONE. DISTRIBUTION. MEASUREMENT. *ATMOSPHERIC SOUNDING. BALLOONS.) (EXPERIMENTAL DATA. DATA PROCESSING SYSTEMS.)

***PACKAGING**

AD-273 152 62-2-5 DIV. 12
REED RESEARCH. INC.. WASHINGTON. D. C.
(PREPARATION OF STANDARDS AND SPECIFICATIONS FOR DESIGN OF *GUIDED MISSILES. SHIPPING AND STORAGE. *CONTAINERS.) (GUIDED MISSILES. *PACKAGING. MILITARY REQUIREMENTS.) (STANDARDIZATION OF HANDBOOKS FOR DESIGN OF GUIDED MISSILES. CONTAINERS.)

AD-273 400 62-2-5 DIV. 14
PLASTICS TECHNICAL EVALUATION CENTER. PICATINNY ARSENAL. DOVER. N. J.
(*PLASTICS. MATERIALS. *PACKAGING. CONTAINERS. SHOCK RESISTANCE. DESIGN. THEORY.) (EXPANDED PLASTICS. STRESSES. MECHANICAL PROPERTIES. PHYSICAL PROPERTIES.) (POLYMERS. URETHANES. STYRENES. ETHYLENES.)

***PARABOLIC ANTENNAS**

AD-273 056 62-2-5 DIV. 8
ANTENNA LAB.. OHIO STATE U. RESEARCH FOUNDATION. COLUMBUS.
(*RADIOMETERS. X BAND. DIRECT CURRENT. ALTERNATING CURRENT. SWITCHING CIRCUITS. CALIBRATION. INSTRUMENTATION. TEST EQUIPMENT. DESIGN.) (*PARABOLIC ANTENNAS. NOISE (RADAR). NOISE (RADIO). REFLECTORS. ALUMINUM. GLASS TEXTILES. LENSES. MICROWAVES. REFLECTION. *IRE SCREENS. MEASUREMENT.)

AD-273 106 62-2-5 DIV. 8
HAZELTINE RESEARCH CORP.. LITTLE NECK. N. Y.
(*PARABOLIC ANTENNAS. *RADAR ANTENNAS. L BAND. SEARCH RADAR. IDENTIFICATON SYSTEMS. MOBILE. ANTENNA RADIATION PATTERNS. *ANTENNA HORNS. ANTENNA HARDWARE. DESIGN.) (RADIOFREQUENCY CABLES. COAXIAL CABLES. TRANSMISSION LINES. COUPLED ANTENNAS. *WAVE GUIDES. STANDING WAVE RATIOS. MEASUREMENT.) (ANTENNAS. CONTROL SYSTEMS. CONTROL UNITS. CIRCUITS. SYNCHRO DATA. TESTS.) (RADAR ANTENNAS. SHELTERS.)

***PARACHUTES**

AD-273 035 62-2-5 DIV. 14
NONMETALLIC MATERIALS LAB.. AERONAUTICAL

SYSTEMS DIV.; •LIGHT-PATTERSON AIR FORCE BASE, OHIO.
(•PARACHUTES; PARACHUTE FABRICS, PROTECTIVE COVERINGS; •FIRE RESISTANT TEXTILES; SYNTHETIC FIBERS; HEAT RESISTANT POLYMERS; EFFECTIVENESS.) (TESTS; TEST METHODS; AIRCRAFT FIELS; SIMULATION.)

•PARAMAGNETIC CRYSTALS

AD-273 113 62-2-5 DIV. 9
ANTENNA LAB.; OHIO STATE U. RESEARCH FOUNDATION; COLUMBUS.
(DETECTORS; •MICROWAVE EQUIPMENT; •OPTICAL EQUIPMENT; •MAGNETO-OPTIC ROTATION; •PARAMAGNETIC CRYSTALS; MAGNETIC FIELDS; CRYSTAL DETECTORS; LATTICES; NUCLEAR SPINS; CRYSTAL STRUCTURE; RELAXATION TIME; SUPERREGENERATION; THEORY; DESIGN; SENSITIVITY.) (ELECTROMAGNETIC WAVES; •MICROWAVES; RESONANCE ABSORPTION; •LIGHT; MODULATION; RADIOFREQUENCY POWER; DETECTION.)

•PELLETS

AD-273 236 62-2-5 DIV. 25
LITTLE, ARTHUR D., INC., CAMBRIDGE, MASS.
(•METEORITES; SATELLITE VEHICLES.) (•PELLETS; •HYPERVELOCITY PROJECTILES; •IMPACT SHOCK; DYNAMICS; PARTICLES.)

•PENTOLITE

AD-273 206 62-2-5 DIV. 22
BALLISTIC RESEARCH LABS., ABERDEEN PROVING GROUND, MD.
(•HYDRODYNAMICS; THEORY OF DETONATION.) (•PENTOLITE; DETONATION; VELOCITY; PRESSURE.) (DETONATION WAVES; THERMODYNAMICS; EQUATIONS OF STATE.) (•EXPLOSIVES; DETONATION; MATHEMATICAL ANALYSIS.) (GASES; SOLIDS; ENTHOPY.)

•PERCHLORATES

AD-273 203 62-2-5 DIV. 4
DIRECTORATE OF MATERIALS AND PROCESSES, AERONAUTICAL SYSTEMS DIV.; •RIGHT-PATTERSON AIR FORCE BASE, OHIO.
(•PYROLYSIS OF •MAGNESIUM COMPOUNDS AND •PERCHLORATES; MEASUREMENT BY DETERMINATION OF CHLORIDES.) (REAGENTS; IRON COMPOUNDS; PERCHLORATES.) CHEMICAL REACTIONS; SPECTROPHOTOMETERS.

•PERTURBATION THEORY

AD-273 247 62-2-5 DIV. 25
MATHEMATICS RESEARCH CENTER, U. OF WISCONSIN, MADISON.
(•SHOCK WAVES; FLUID FLOW; •MAGNETOHYDRODYNAMICS; PARTICLES; MAGNETIC FIELDS.) (COMPRESSIBLE FLOW; GAS IONIZATION; •FLUID MECHANICS; ACOUSTICS.) (•PERTURBATION THEORY; PARTIAL DIFFERENTIAL EQUATIONS.)

•PHASE STUDIES

AD-273 216 62-2-5 DIV. 17

CENTRAL INST. FOR INDUSTRIAL RESEARCH (NORWAY).
(•NIOBIUM; •TANTALUM; HIGH TEMPERATURE RESEARCH; OXIDATION; •PHASE STUDIES; NIOBIUM COMPOUNDS; TANTALUM COMPOUNDS; ELECTRON DIFFRACTION ANALYSIS)

AD-273 232 62-2-5 DIV. 17
ILLINOIS U., URBANA.
(METALS; •NIOBIUM; GASES; •NITROGEN; •PHASE STUDIES; THERMODYNAMICS; PRESSURE; TEMPERATURE.) (HEAT OF FORMATION; HEAT OF SOLUTION; SOLIDS; SOLUTIONS; SOLUBILITY; BLACKBODY RADIATION; DATA.) (X-RAY DIFFRACTION ANALYSIS; MICROSCOPY; LATTICES; PRECIPITATION; INTERNAL FRICTION; HIGH TEMPERATURE RESEARCH.) SOLID STATE PHYSICS; METALLURGY.

•PHASE TRANSITIONS

AD-273 221 62-2-5 DIV. 17
GENERAL DYNAMICS/ASTRONAUTICS, SAN DIEGO, CALIF.
(STAINLESS STEEL (300 SERIES); •PHASE TRANSITIONS; •AUSTENITE; DECOMPOSITION; MARTENSITE; MEASUREMENT; CRYOGENICS; TEMPERATURE; DEFORMATION; MECHANICAL PROPERTIES; MAGNETIC PROPERTIES.) (TEST METHODS; TEST EQUIPMENT; FERROMAGNETISM.) LOW TEMPERATURE RESEARCH; SOLID STATE PHYSICS; ALLOYS.

•PHILIPPINE ISLANDS

AD-273 186 62-2-5 DIV. 2
1ST WEATHER WING; AIR FORCE.
(•CLIMATE AND METEOROLOGICAL DATA OF THE •PHILIPPINE ISLANDS FOR AIR FORCE OPERATIONS AT CLARK AFB.) (CLIMATE OF JAPAN; KOREA; CHINA; MANCHURIA; TAIWAN AND THE PACIFIC OCEAN.)

•PHOTOCHEMICAL REACTIONS

AD-273 125 62-2-5 DIV. 4

FELTMAN RESEARCH LABS., PICATINNY ARSENAL, DOVER, N. J.
(CHEMICAL REACTIONS; PHOTOCHEMISTRY; •PHOTOCHEMICAL REACTIONS; •NITROGEN COMPOUNDS AND DIOXIDES; LIGHT; ULTRAVIOLET RADIATION.) ULTRAVIOLET SPECTROSCOPY; USSR.

•PHOTOGRAPHIC RECORDING SYSTEMS

AD-273 263 62-2-5 DIV. 24
TACTICAL AIR COMMAND; LANGLEY AIR FORCE BASE, VA.
(SIGNAL LIGHTS FOR •PHOTOGRAPHIC RECORDING SYSTEMS; GUN SIGHT CAMERAS; EFFECTIVENESS AS TRAINING DEVICES IN JET FIGHTERS, LAUNCHING; AIM TO SURFACE; GUIDED MISSILES.) (FLIGHT TESTING OF DESIGN.)

AD-273 345 62-2-5 DIV. 24
AEROSPACE CORP., EL SEGUNDO, CALIF.
(MATHEMATICAL ANALYSIS OF EFFECTIVENESS OF HIGH ALTITUDE; •PHOTOGRAPHIC RECORDING SYSTEMS FOR •AERIAL RECONNAISSANCE OF SURFACE TARGETS.) (DIFFERENTIAL EQUATIONS; PHOTOGRAPHIC ANALYSIS FOR MATHEMATICAL PREDICTION OF OPTICAL IMAGES.)

•PHOTOTUBES

AD-273 336 62-2-5 DIV. 8
•WESTINGHOUSE ELECTRIC CORP., BALTIMORE, MD.
(•PHOTOTUBES; •SOLAR CELLS; SOLAR ENERGY; •POWER TRANSFORMERS; •GENERATORS; DESIGN; PRODUCTION; MANUFACTURING METHODS.) (ELECTRON TUBES; CATHODES (ELECTRON TUBES); PHOTOSENSITIVITY; PHOTOEMISSION; ANODES (ELECTRON TUBES); GLASS; INSULATING MATERIALS; VACUUM SEALS; PROCESSING; CLEANING; TEST METHODS.)

•PHYSICS

AD-273 054 62-2-5 DIV. 25
MICROWAVE RESEARCH INST., POLYTECHNIC INST. OF BROOKLYN, N. Y.
(•ELECTROMAGNETIC FIELDS; •PROPAGATION; ANALYSIS; •SYNTHESIS; •WAVEGUIDES.) (•SPHERES; •CYLINDRICAL BODIES; •GREEN'S FUNCTION; VECTOR ANALYSIS.) (•PHYSICS; PARTIAL DIFFERENTIAL EQUATIONS.) (COMPLEX VARIABLES; FUNCTIONS; TRANSFORMATIONS (MATHEMATICS); BESSEL FUNCTIONS; INTEGRAL EQUATIONS.)

•PLANETARY ATMOSPHERES

AD-273 143 62-2-5 DIV. 2
LABORATORY OF ASTROPHYSICS AND PHYSICAL METEOROLOGY, JOHNS HOPKINS U., BALTIMORE, MD.
(•ASTRONOMICAL OBSERVATORIES, •RATOSPHERE BY HIGH ALTITUDE BALLOONS; INSTRUMENTATION.) (PHYSICAL PROPERTIES OF •PLANETARY ATMOSPHERES; DETERMINATION; RECORDING DEVICES EXPERIMENTAL DATA.)

•PLASMA OSCILLATIONS

AD-273 155 62-2-5 DIV. 25
RAND CORP., SANTA MONICA, CALIF.
(TRANSPORT PROPERTIES AND •DAMPING OF •PLASMA OSCILLATIONS)

•PLASMA PHYSICS

AD-273 067 62-2-5 DIV. 25
GENERAL MOTORS RESEARCH LABS., WARREN, MICH.
(•NUCLEAR ENERGY; FISSION; FISSION PRODUCTS; •PLASMA PHYSICS; THERMIONIC EMISSION.) (LIQUIDS; •RARE GASES; ELECTRONS; •ELECTRIC POWER PRODUCTION.) (CATHODES; CESIUM; •CESIUM ELECTRON TUBES.)

AD-273 072 62-2-5 DIV. 25
LINCOLN LAB., MASS. INST. OF TECH., LEXINGTON.
(ATMOSPHERE ENTRY; RE-ENTRY VEHICLES; •PLASMA PHYSICS; •RE-ENTRY AERODYNAMICS; •MAGNETOHYDRODYNAMICS.) (•ELECTROMAGNETIC FIELDS; •GAS IONIZATION; ELECTRONS; DENSITY; MEASUREMENT IN TURBULENT FLOW; •RAKE; SHOCK WAVES; ABLATION.) (•WAVE TRANSMISSION; REFLECTION; S BAND; ULTRA HIGH FREQUENCY; RADAR TRACKING; RADAR SIGNALS.) (TELEMETER SYSTEMS; DATA PROCESSING SYSTEMS; PROGRAMMING; DIGITAL COMPUTERS.) (INSTRUMENTATION; PHOTOGRAPHY; SCHLIEREN PHOTOGRAPHY.) OPTICAL TRACKING.

AD-273 075 62-2-5 DIV. 8
RESEARCH LAB. OF ELECTRONICS, MASS. INST. OF TECH., CAMBRIDGE.
(•ELECTRONICS; X-RAY SPECTROSOPY PHYSICAL CHEMISTRY; THERMODYNAMICS; MICROWAVE SPECTROSCOPY; MASERS; NUCLEAR MAGNETIC RESONANCE; •MICROWAVES; MOLECULAR BEAMS; RADIO ASTRONOMY; •PLASMA PHYSICS; MAGNETOHYDRODYNAMICS; •COMMUNICATIONS THEORY; LANGUAGES; NEUROLOGY; SPEECH.)

AD-273 149 62-2-5 DIV. 25
MICROWAVE RESEARCH INST., POLYTECHNIC INST. OF BROOKLYN, N. Y.
(•ELECTROMAGNETIC WAVES; •SCATTERING; •PLASMA PHYSICS; COMPRESSION SHOCK; ACOUSTICS; OPTICS; WAVE TRANSMISSION; AIR.) (GAS IONIZATION; MAGNETIC FIELDS; REFLECTION; SURFACE PROPERTIES; •PROPAGATION.) (DIFFERENTIAL EQUATIONS; TRANSFORMATIONS (MATHEMATICS); PARTIAL DIFFERENTIAL EQUATIONS.)

AD-273 248 62-2-5 DIV. 25
MINNESOTA U., MINNEAPOLIS.
(•GAS DISCHARGES; •NOISE; THEORY.) (•PLASMA PHYSICS; GAS IONIZATION; ELECTROMAGNETIC WAVES; LOW FREQUENCY; HIGH FREQUENCY; TEMPERATURE.) (TEST METHODS; TEST EQUIPMENT; DISCHARGE TUBES.)

AD-273 249 62-2-5 DIV. 25
MINNESOTA U., MINNEAPOLIS.
(•GAS DISCHARGES; NOISE; THEORY.) (•ELECTROMAGNETIC WAVES; MEASUREMENT; •PLASMA PHYSICS; BREMSSTRAHLUNG; HIGH FREQUENCY; NEON; WAVE TRANSMISSION.) (•GAS IONIZATION; ELECTRONS; ENERGY; IONS; •DISCHARGE TUBES.)

AD-273 267 62-2-5 DIV. 25
REPUBLIC AVIATION CORP., FARMINGDALE, N. Y.
(•ELECTRON BEAMS; MODULATION; •PLASMA PHYSICS; MAGNETIC FIELDS.) (VELOCITY AND MOTION; EQUATIONS.) (PARTIAL DIFFERENTIAL EQUATIONS; BESSEL FUNCTIONS; PERTURBATION THEORY.)

•PLASTIC COATINGS

AD-273 080 62-2-5 DIV. 14
MOTOROLA, INC., CHICAGO, ILL.
(•PRINTED CIRCUITS; •COATINGS •PLASTIC COATINGS; EPOXY RESINS; SILICONE RESINS; POLYMERS; URETHANES; RESINS ON LAMINATES; GLASS; PAPER; COPPER.) (•ELECTRIC INSULATION; THERMAL INSULATION; MATERIALS; ELECTRICAL PROPERTIES; DIELECTRIC PROPERTIES, ADHESION; CORROSION; MOISTUREPROOFING.) MILITARY REQUIREMENTS.

•PLASTIC FLOW

AD-273 292 62-2-5 DIV. 17

DYNAMIC PROPERTIES LAB., CALIF. INST. OF TECH.
(•METALS; •FRACTURE (MECHANICS), ELASTICITY; PLASTICITY; •PLASTIC FLOW; DEFORMATION; GRAINS (METALLURGY).) (STEEL; ZINC; SINGLE CRYSTALS.) BRITTLE MATERIALS.

•PLASTICITY

AD-273 222 62-2-5 DIV. 14
GENERAL DYNAMICS/ASTRONAUTICS, SAN DIEGO, CALIF.
(•CERAMIC MATERIALS; •BRITTLE MATERIALS; SOLIDS; SINGLE CRYSTALS; •DEFORMATION; •PLASTICITY; MECHANICAL PROPERTIES; PHYSICAL PROPERTIES.) (TEST METHODS; TEST EQUIPMENT.) (•SODIUM COMPOUNDS; CHLORINES; •MAGNESIUM COMPOUNDS; OXIDES; DATA.) SOLID STATE PHYSICS.

•PLASTICS

AD-273 065 62-2-5 DIV. 14
GENERAL DYNAMICS/ASTRONAUTICS, SAN DIEGO, CALIF.
(•ALLOYS; •METALS; •PLASTICS; EXPANDED PLASTICS; •GLASS TEXTILES; LAMINATES; SHEETS; METAL PLATES; TITANIUM; •TITANIUM ALLOYS; •ALUMINUM ALLOYS; •STAINLESS STEEL; •STEEL; •NICKEL ALLOYS.) (LOW TEMPERATURE RESEARCH; CRYOGENICS; MECHANICAL PROPERTIES; PHYSICAL PROPERTIES; FATIGUE (MECHANICS); CORROSION.) (MARTENSITE; X-RAY DIFFRACTION ANALYSIS.) (THERMAL EXPANSION; MEASUREMENT.)

AD-273 400 62-2-5 DIV. 14
PLASTICS TECHNICAL EVALUATION CENTER, PICATINNY ARSENAL, DOVER, N. J.
(•PLASTICS; MATERIALS; •PACKAGING; CONTAINERS; SHOCK RESISTANCE; DESIGN; THEORY.) (EXPANDED PLASTICS; STRESSES; MECHANICAL PROPERTIES; PHYSICAL PROPERTIES.) (POLYMERS; URETHANES; STYRENES; ETHYLENES.)

•PLATING

AD-273 215 62-2-5 DIV. 14
CALIFORNIA U., BERKELEY.
(•PLATING; •SHEETS; SURFACE TEMPERATURES; •HEAT TRANSFER.) (MATERIALS; HEAT SHIELDS OR SINKS; THERMAL CONDUCTIVITY.) (GRAPHITE; TEMPERATURE; MEASUREMENT; PHYSICAL PROPERTIES; HIGH TEMPERATURE RESEARCH.)

•POINT DETONATING FUZES

AD-273 162 62-2-5 DIV. 22
WHIRLPOOL CORP., EVANSVILLE, IND.
(HOWITZERS; GUNS; •PROJECTILE FUZES; •TIME DELAY FUZES; •POINT DETONATING FUZES; DETONATORS; PHOTOGRAPHIC ANALYSIS.)

•POLYMERS

AD-273 013 62-2-5 DIV. 4
BRITISH COTTON INDUSTRY RESEARCH ASSOCIATION, •MANCHESTER, ENGLAND.
(•OXYCELLULOSE, •POLYMERS, CONDENSATION, CHEMICAL REACTIONS, CARBAZIDES HYDRAZINE DERIVATIVES OF CYANURIC ACID OR PHOSPHONYL RADICALS, •NITRILO RADICALS,) (GLUCOSIDES AND ETHANOLS, AMINES OR PHENYL RADICALS, UREA,) (SUBSTITUTION REACTIONS, OXIDATION, PYROLYSIS,) CELLULOSE CHEMISTRY

•POLYNOMIALS

AD-273 288 62-2-5 DIV. 15
AIR FORCE CAMBRIDGE RESEARCH LABS., BEDFORD, MASS.
(ROOTS OF A 4TH ORDER, •POLYNOMIALS, EQUATIONS, NUMERICAL ANALYSIS, MATRIX ALGEBRA,)

AD-273 616 62-2-5 DIV. 8
ELECTRICAL ENGINEERING RESEARCH LAB., U. OF ILLINOIS, URBANA.
(•ELECTRICAL NETWORKS, SYNTHESIS, •SWITCHING CIRCUITS, •PROGRAMMING, •TRANSISTORS, DIODES, FEEDBACK, LINEAR SYSTEMS,) (•POLYNOMIALS, LEAST SQUARES METHOD, SERIES PROBABILITY, TABLES, EXPERIMENTAL DATA,)

•POTENTIOMETERS

AD-273 422 62-2-5 DIV. 7
BECKMAN INSTRUMENTS DIV., DAYSTROM, INC., NEWARK
(METAL FILMS, •VARIABLE RESISTORS, •POTENTIOMETERS, DESIGN, PRODUCTION, TEST FACILITIES, TESTS, MILITARY REQUIREMENTS,)

•POWDER METALS

AD-273 090 62-2-5 DIV. 17
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION, WASHINGTON, D. C.
(PRODUCTION, •POWDER METALS, ABRASIVES, LIQUIDS, •BALL MILLS,) (COPPER, IRON, CHROMIUM, NICKEL, SILVER,) (WATER, CYCLOHEXANES, HEPTANES, CHLORIDES, METHANES, ETHANOLS,) (INORGANIC SUBSTANCES, SALTS, REAGENTS, PIGMENTS, COATINGS, SOLDERING ALLOY, PROPELLANTS, POWDER METALLURGY, DISPERSION HARDENING, METALS,

AD-273 276 62-2-5 DIV. 14
VITRO LABS., WEST ORANGE, N. J.
(•REFRACTORY MATERIALS, •CERAMIC MATERIALS, PARTICLES, •POWDER METALS, PREPARATION, VAPORIZATION, CHEMICAL PROPERTIES, PHYSICAL PROPERTIES,) (OXIDES OF ALUMINUM COMPOUNDS, TUNGSTEN COMPOUNDS, MOLYBDENUM COMPOUNDS, IRON COMPOUNDS, MAGNESIUM COMPOUNDS, ZIRCONIUM COMPOUNDS, NIOBIUM COMPOUNDS, SILICON COMPOUNDS, THORIUM COMPOUNDS,) (METALS, MOLYBDENUM, TUNGSTEN, ALUMINUM,) (CARBIDES, TANTALUM COMPOUNDS,)

•POWER REACTORS

AD-273 412 62-2-5 DIV. 20
FOREIGN TECH. DIV., AIR FORCE SYSTEMS COMMAND, •WRIGHT-PATTERSON AIR FORCE BASE, OHIO.
(•POWER REACTORS, •SPHERES, PARTICLES, VELOCITY, DIFFUSION, SCATTERING, REFLECTION,) (HETEROGENEOUS REACTORS, •BOILING WATER REACTORS, •NUCLEAR POWER PLANTS, •KINETIC THEORY,) (GRAPHITE, BERYLLIUM, PLUTONIUM COMPOUNDS, STATISTICAL DISTRIBUTIONS, STATISTICAL FUNCTIONS, POLYNOMIALS, FUNCTIONS, INTEGRAL EQUATIONS, NUMERICAL METHODS AND PROCEDURES, TABLES,)

•POWER TRANSFORMERS

AD-273 336 62-2-5 DIV. 5
WESTINGHOUSE ELECTRIC CORP., BALTIMORE, MD.
(•PHOTOTUBES, •SOLAR CELLS, SOLAR ENERGY, •POWER TRANSFORMERS, •GENERATORS, DESIGN, PRODUCTION, MANUFACTURING METHODS,) (ELECTRON TUBES, CATHODES (ELECTRON TUBES), PHOTOSENSITIVITY, PHOTOEMISSION, ANODES (ELECTRON TUBES), GLASS, INSULATING MATERIALS, VACUUM SEALS, PROCESSING, CLEANING, TEST METHODS,)

•PRESSURE REGULATORS

AD-273 063 62-2-5 DIV. 26
FAIRBANK CO., GLENDALE, CALIF.
(•GAS VALVES, •CONTROL VALVES, HYDRAULIC ACTUATORS, SPRINGS, DESIGN, TESTS, VIBRATION, TEMPERATURE, ACCELERATION,) (SAFETY VALVES, •PRESSURE REGULATORS, DESIGN, TESTS,) (GUIDED MISSILES, SATELLITE VEHICLES,)

AD-273 064 62-2-5 DIV. 26
FAIRBANK CO., GLENDALE, CALIF.
(•SAFETY VALVES, •PRESSURE REGULATORS, HYDRAULIC ACTUATORS, DESIGN, TESTS, GUIDED MISSILES, SOLENOIDS, •CONTROL VALVES) (•GAS VALVES, SPECIFICATIONS, TEST METHODS,

•PRESSURE VESSELS

AD-273 073 62-2-5 DIV. 27
LOCKHEED AIRCRAFT CORP., SUNNYVALE, CALIF.
(•ROCKET MOTORS, •ROCKET MOTOR NOZZLES, •PRESSURE VESSELS, PLASTICS, MATERIALS, FILAMENT WOUND CONSTRUCTION, JATOS,) •BIBLIOGRAPHY,

AD-273 306 62-2-5 DIV. 13
LOCKHEED AIRCRAFT CORP., SUNNYVALE, CALIF.
(•STRUCTURES, MEMBRANES, •PRESSURE VESSELS,) (•MEMBRANES, FILAMENTS,) (LOAD DISTRIBUTION, •STRUCTURAL SHELLS, TENSILE PROPERTIES, MATHEMATICAL ANALYSIS,) STRESSES,

•PRINTED CIRCUITS

AD-273 080 62-2-5 DIV. 14
MOTOROLA, INC., CHICAGO, ILL.
(•PRINTED CIRCUITS, •COATINGS •PLASTIC COATINGS, EPOXY RESINS, SILICONE RESINS, POLYMERS, URETHANES, RESINS ON LAMINATES, GLASS, PAPER, COPPER,) (•ELECTRIC INSULATION, THERMAL INSULATION, MATERIALS, ELECTRICAL PROPERTIES, DIELECTRIC PROPERTIES ADHESION, CORROSION, •MOISTUREPROOFING,) MILITARY REQUIREMENTS,

•PROCESSING

AD-273 004 62-2-5 DIV. 17
MANUFACTURING LABS., INC., CAMBRIDGE, MASS.
(•PROCESSING, HEAT TREATMENT AND DEFORMATION, HARDENING, AGING ON •STEEL (M11), MECHANICAL PROPERTIES, TENSILE PROPERTIES,) (AUSTENITE, DETERMINATION BY X-RAY DIFFRACTION ANALYSIS,) (MICROSTRUCTURE BY ELECTRON MICROSCOPY,) (FRACTURE (MECHANICS), IMPACT SHOCK, TEST METHODS,)

AD-273 179 62-2-5 DIV. 26
CHANCE VOUGHT CORP., DALLAS, TEX.
(ALLOYS, •METALS, •SHEETS, PIPES, CYLINDRICAL BODIES, •PROCESSING, TOOLS, DIES, DESIGN, ANALYSIS,) (DEFORMATION, EXPLOSIVE FORMING, METAL FORMING PRESSES, METAL PLATES, HYDROSTATIC PRESSURE, ELECTROMAGNETISM, HYDRAULIC PRESSES,) BERYLLIUM, STAINLESS STEEL, TITANIUM ALLOYS, TOOL STEEL, TUNGSTEN CHROMIUM ALLOYS, ALUMINUM ALLOYS, MOLYBDENUM ALLOYS, NICKEL ALLOYS, COBALT ALLOYS, NIOBIUM ALLOYS, VANADIUM ALLOYS, SOLID STATE PHYSICS, SOLIDS, LIQUIDS, GASES, INDUSTRIAL PRODUCTION, HANDBOOKS,

•PROGRAMMING

AD-273 235 62-2-5 DIV. 30
LITTON SYSTEMS, INC., WALTHAM, MASS.
(•PROGRAMMING, PATTERN RECOGNITION, •SAMPLING, •DATA PROCESSING SYSTEMS, AUTOMATIC DECISION THEORY, •STATISTICAL ANALYSIS,) (DIGITAL COMPUTERS, TESTS, SIGNAL-TO-NOISE RATIO,) (INTEGRAL EQUATIONS, MATRIX ALGEBRA, TIME, •TRANSFORMATIONS (MATHEMATICS), SEQUENCES, TAYLOR'S SERIES, STATISTICAL DISTRIBUTIONS, PROBABILITY, INEQUALITIES,)

AD-273 410 62-2-5 DIV. 8
ELECTRICAL ENGINEERING RESEARCH LAB., U. OF ILLINOIS, URBANA.
(•ELECTRICAL NETWORKS, SYNTHESIS, •SWITCHING CIRCUITS, •PROGRAMMING, •TRANSISTORS, DIODES, FEEDBACK, LINEAR SYSTEMS,) (•POLYNOMIALS, LEAST SQUARES METHOD, SERIES PROBABILITY, TABLES, EXPERIMENTAL DATA,)

•PROJECTILE FUZES

AD-273 162 62-2-5 DIV. 22
WHIRLPOOL CORP., EVANSVILLE, IND.
(HOWITZERS, GUNS, •PROJECTILE FUZES, •TIME DELAY FUZES, •POINT DETONATING FUZES, DETONATORS, PHOTOGRAPHIC ANALYSIS,

•PROJECTILES

AD-273 060 62-2-5 DIV. 22
BECKMAN AND WHITLEY, INC., SAN CARLOS, CALIF.
(•PROJECTILES, ALUMINUM, PENETRATION, BODY ARMOR, STRESSES, IMPACT SHOCK) (BULLET SOUNDS, SIMULATION,)

AD-273 193 62-2-5 DIV. 22
AIR FORCE PROVING GROUND COMMAND, EGLIN AIR FORCE BASE, FLA.
(•AIRCRAFT FIRE CONTROL SYSTEMS •FIRING ERROR INDICATORS, EFFECTIVENESS, RELIABILITY, TESTS,) (AERIAL TARGETS, TARGET DRONES, FIRING ERROR INDICATORS, AIRCRAFT AMMUNITION, •ROCKETS,) (FIRING ERROR INDICATORS, GAMMA RAYS, RADIOACTIVE ISOTOPES, RADIATION HAZARDS,) (PILOTS, •RADIATION HAZARDS,) (•PROJECTILES, RADIOACTIVITY, ROCKET TARGETS, TRACKING,)

AD-273 315 62-2-5 DIV. 22
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION, WASHINGTON, D. C.
(•TERMINAL BALLISTICS OF PLASTICS, •PROJECTILES ON ALUMINUM ALLOYS, TARGETS, MUZZLE VELOCITY, MEASUREMENT, PENETRATION, IMPACT SHOCK,) HYPERVELOCITY PROJECTILES, METEORITES, SATELLITE VEHICLES,

•PROPAGATION

AD-273 054 62-2-5 DIV. 25
MICROWAVE RESEARCH INST., POLYTECHNIC INST. OF BROOKLYN, N. Y.
(•ELECTROMAGNETIC FIELDS, •PROPAGATION, ANALYSIS, •SYNTHESIS, •WAVEGUIDES,) (•SPHERES, •CYLINDRICAL BODIES, •GREEN'S FUNCTION, VECTOR ANALYSIS,) (•PHYSICS, PARTIAL DIFFERENTIAL EQUATIONS,) (COMPLEX VARIABLES, FUNCTIONS, TRANSFORMATIONS (MATHEMATICS), BESSEL FUNCTIONS, INTEGRAL EQUATIONS,)

AD-273 149 62-2-5 DIV. 25
MICROWAVE RESEARCH INST., POLYTECHNIC INST. OF BROOKLYN, N. Y.
(•ELECTROMAGNETIC WAVES, •SCATTERING, •PLASMA PHYSICS, COMPRESSION SHOCK, ACOUSTICS, OPTICS, •WAVE TRANSMISSION, AIR,) (GAS IONIZATION, MAGNETIC FIELDS, REFLECTION, SURFACE PROPERTIES, •PROPAGATION,) (DIFFERENTIAL EQUATIONS, TRANSFORMATIONS (MATHEMATICS), PARTIAL DIFFERENTIAL EQUATIONS,)

AD-273 257 62-2-5 DIV. 8
NAVAL RESEARCH LAB., WASHINGTON, D. C.
(•MICROWAVES, •PROPAGATION, •SCATTERING, PACIFIC OCEAN,) (X BAND, S BAND,)

•PROPELLANT GRAINS

AD-273 012 62-2-5 DIV. 10
ROHM AND HAAS CO., HUNTSVILLE, ALA.
(•PROPELLANT GRAINS, •SOLID ROCKET PROPELLANTS, DESIGN, CONFIGURATION,) (MATHEMATICAL ANALYSIS, PROGRAMMING, •TABLES, SURFACES,)

•PROPELLANTS

AD-273 262 62-2-5 DIV. 6
TRACERLAB, INC., WALTHAM, MASS.
(•FEASIBILITY STUDY, •PROPELLANTS, •DETECTION IN THE ATMOSPHERE BY •RADIOACTIVATION ANALYSIS,) (GASES, •RADIOACTIVE ISOTOPES, •KRYPTON, OXIDATION-REDUCTION REACTIONS,)

•PROTECTIVE CLOTHING

AD-273 039 62-2-5 DIV. 3
ARMY CHEMICAL RESEARCH AND DEVELOPMENT LABS., ARMY CHEMICAL CENTER, MD.
(•PROTECTIVE CLOTHING, IMPREGNATION, •DECONTAMINATION KITS, DESIGN,) (TEST METHODS, DECONTAMINATION, TEMPERATURE)

•PROTECTIVE COVERINGS

AD-273 202 62-2-5 DIV. 13
ARMY ENGINEER RESEARCH AND DEVELOPMENT LABS., FORT BELVOIR, VA.
(•PROTECTIVE COVERINGS, •SHELTERS, PORTABLE SHELTERS, •CONSTRUCTION, STRUCTURE, DESIGN,) (MILITARY ENGINEERING, STRUCTURES MATERIALS, BLAST RESISTANCE, NUCLEAR EXPLOSIONS, ATOMIC BOMB EXPLOSIONS, NUCLEAR WEAPONS, RADIOLOGICAL CONTAMINATION, RADIATION EFFECTS, EFFECTIVENESS, TESTS,)

•PYROLYSIS

AD-273 203 62-2-5 DIV. 4
DIRECTORATE OF MATERIALS AND PROCESSES, AERONAUTICAL SYSTEMS DIV., WRIGHT-PATTERSON AIR FORCE BASE, OHIO.
(•PYROLYSIS OF •MAGNESIUM COMPOUNDS AND •PERCHLORATES, MEASUREMENT BY DETERMINATION OF CHLORIDES,) (REAGENTS, IRON COMPOUNDS, PERCHLORATES,) CHEMICAL REACTIONS, SPECTROPHOTOMETERS,

•PYROTECHNICS

AD-273 042 62-2-5 DIV. 3
DIAMOND ORDNANCE FUZE LABS., WASHINGTON, D. C.
(•PYROTECHNICS, •DELAY ELEMENTS, •DELAY POWDERS FOR BOMB FUZES, DESIGN, TEST, TEST METHODS,) (MATERIALS, CHROMATES, BARIUM COMPOUNDS, IRON COMPOUNDS, OXIDES, MANGANESE COMPOUNDS, LEAD COMPOUNDS, ZIRCONIUM COMPOUNDS, COMBUSTION, STORAGE, STABILITY,) IGNITERS, PRIMERS, HEATING ELEMENTS,

•QUANTUM MECHANICS

AD-273 025 62-2-5 DIV. 25
MICROWAVE RESEARCH INST., POLYTECHNIC INST. OF BROOKLYN, N. Y.
(•ELECTROMAGNETIC THEORY, •QUAN-

TUM MECHANICS.) (*ELECTROMAGNETIC WAVES; *DIFFRACTION; *OPERATORS (MATHEMATICS); *TRANSFORMATIONS (MATHEMATICS); VECTOR ANALYSIS; MATRIX ALGEBRA; ALGEBRA; GREEN'S FUNCTION; PERTURBATION THEORY.)

***RADAR**

AD-273 074 62-2-5 DIV. 6
LOCKHEED AIRCRAFT CORP., SUNNYVALE, CALIF.
(*RADAR; RADAR RANGES; *RADAR TRACKING; RADAR DECEPTION; COUNTERMEASURES; DOPPLER RADAR; *SEARCH RADAR; *RADAR SIGNAL; *RADAR PULSES.) *BIBLIOGRAPHY.

***RADAR ANTENNAS**

AD-273 045 62-2-5 DIV. 8
STANFORD RESEARCH INST., MENLO PARK, CALIF.
(*RADAR ANTENNAS; *COUPLED ANTENNAS; DESIGN USING RADIO INTERFEROMETERS.) (SIME SCREENS; MICROWAVE FREQUENCY; *LENS ANTENNAS; RADAR SCANNING; ELECTRONIC SCANNERS; THEORY; DESIGN.) (DIRECTION FINDING; COMMUNICATION EQUIPMENT; HIGH FREQUENCY; ANTENNAS.)

AD-273 109 62-2-5 DIV. 8
HAZELTINE RESEARCH CORP., LITTLE NECK, N. Y.
(*PARABOLIC ANTENNAS; *RADAR ANTENNAS; L BAND; SEARCH RADAR; IDENTIFICATION SYSTEMS; MOBILE; ANTENNA RADIATION PATTERNS; *ANTENNA HORNS; ANTENNA HARDWARE; DESIGN.) (RADIOFREQUENCY CABLES; COAXIAL CABLES; TRANSMISSION LINES; COUPLED ANTENNAS; *WAVE GUIDES; STANDING WAVE RATIOS; MEASUREMENT.) (ANTENNAS; CONTROL SYSTEMS; CONTROL BOXES; CIRCUITS; SYNCHRO DATA; TESTS.) (RADAR ANTENNAS; SHELTERS.)

***RADAR CONFUSION REFLECTORS**

AD-273 111 62-2-5 DIV. 5
RADIATION, INC., MELBOURNE, FLA.
(*RADIO COMMUNICATION SYSTEMS *SECRET COMMUNICATION SYSTEMS; *RADIO RELAY SYSTEMS; ULTRA HIGH FREQUENCY; REFLECTORS; RELIABILITY; DESIGN; TESTS.) (COMMUNICATION EQUIPMENT; *RADAR CONFUSION REFLECTORS; *RADIO TRANSMISSION.) (RADIO SIGNALS; RADIO WAVES PROPAGATION; REFLECTION; SCATTERING.)

***RADAR ECHO AREAS**

AD-273 006 62-2-5 DIV. 6
RADIATION LAB., U. OF MICHIGAN, ANN ARBOR.
(MATHEMATICAL ANALYSIS OF *RADAR ECHO AREAS FROM *SPHERES.) (DIFFRACTION; SCATTERING OF ELECTROMAGNETIC WAVES FROM SPHERES.) TRANSFORMATIONS (MATHEMATIC); BESSEL FUNCTIONS; FUNCTIONS.

AD-273 021 62-2-5 DIV. 2
SASKATCHEWAN U. (CANADA).
(RADIO SIGNALS; *IONOSPHERIC PROPAGATION; *METEORS; WAKE; DETECTION; *RADAR ECHO AREAS; REFLECTION; ULTRA HIGH FREQUENCY.)

***RADAR OPERATORS**

AD-273 347 62-2-5 DIV. 30
CALIFORNIA U., LOS ANGELES.
(*MATHEMATICAL COMPUTER DATA; *HUMAN ENGINEERING; *RADAR OPERATORS; BEHAVIOR; TRACKING.) (RADAR TRACKING; CONTROL SYSTEMS.) (*COMPUTERS; LINEAR SYSTEMS; NONLINEAR SYSTEMS; STATISTICAL ANALYSIS.)

***RADAR PULSES**

AD-273 074 62-2-5 DIV. 6
LOCKHEED AIRCRAFT CORP., SUNNYVALE, CALIF.
(*RADAR; RADAR RANGES; *RADAR TRACKING; RADAR DECEPTION; COUNTERMEASURES; DOPPLER RADAR; *SEARCH RADAR; *RADAR SIGNAL; *RADAR PULSES.) *BIBLIOGRAPHY.

***RADAR SIGNALS**

AD-273 074 62-2-5 DIV. 6
LOCKHEED AIRCRAFT CORP., SUNNYVALE, CALIF.
(*RADAR; RADAR RANGES; *RADAR TRACKING; RADAR DECEPTION; COUNTERMEASURES; DOPPLER RADAR; *SEARCH RADAR; *RADAR SIGNAL; *RADAR PULSES.) *BIBLIOGRAPHY.

***RADAR TRACKING**

AD-273 074 62-2-5 DIV. 6
LOCKHEED AIRCRAFT CORP., SUNNYVALE, CALIF.
(*RADAR; RADAR RANGES; *RADAR TRACKING; RADAR DECEPTION; COUNTERMEASURES; DOPPLER RADAR; *SEARCH RADAR; *RADAR SIGNAL; *RADAR PULSES.) *BIBLIOGRAPHY.

***RADAR TRANSMITTERS**

AD-273 272 62-2-5 DIV. 6
AIRBORNE INSTRUMENTS LAB., INC., DEER PARK, LONG ISLAND, N. Y.
(*RADAR TRANSMITTERS; *RADIO TRANSMITTERS; MICROWAVE FREQUENCY; *RADIO-FREQUENCY POWER; MEASUREMENT BY *WAVEMETERS; *MICROWAVE PROBES IN WAVEGUIDES; ANTENNA HORNS.) (*ELECTROMAGNETIC WAVES; TEST EQUIPMENT; WAVE CHARACTERISTICS; *MICROWAVES; ELECTRIC FIELDS; TRANSMISSION LINES; TESTS; MATHEMATICAL ANALYSIS.)

***RADIATION COUNTERS**

AD-273 079 62-2-5 DIV. 2
MAX-PLANCK-INSTITUT FUR AERONOMIE (GERMANY).
(HIGH ALTITUDE; ATMOSPHERE; IONIZATION; *COSMIC RAYS; *AURORAE; *X RAYS; MEASUREMENT; AIRBORNE; INSTRUMENTATION; ELECTRONIC EQUIPMENT; *RADIATION COUNTERS; BALLOONS.) (PULSE COUNTERS; RADIO TRANSMITTERS; POWER SUPPLIES; OSCILLATORS; ELECTRIC FILTERS; RADIO RECEIVERS; ELECTRONIC CIRCUITS; PACKAGING.)

***RADIATION DAMAGE**

AD-273 135 62-2-5 DIV. 14
LOCKHEED AIRCRAFT CORP., SUNNYVALE, CALIF.
(*BIBLIOGRAPHY; *RADIATION EFFECTS.) *RADIATION DAMAGE; POLYMERS; FLUORIDES; ETHYLENES; PLASTICS; *FLUOROCARBONS.

***RADIATION EFFECTS**

AD-273 026 62-2-5 DIV. 20
ARMOUR RESEARCH FOUNDATION, CHICAGO, ILL.
(*ELECTRONS; *ENERGY; *RADIATION EFFECTS; *FOOD; CARBOHYDRATES; SKIN.) (*GAMMA RAYS; DOSAGE; COMPTON SCATTERING; THEORY.)

AD-273 223 62-2-5 DIV. 17
GENERAL DYNAMICS/ASTRONAUTICS, SAN DIEGO, CALIF.
(*RADIATION EFFECTS OF NUCLEAR ENERGY ON ALLOYS; *STAINLESS STEEL (301) (310); *TITANIUM ALLOYS (A110AT); *ALUMINUM ALLOYS (2014-T6); CRYOGENICS; LIQUEFIED GASES, HYDROGEN.) (TESTS; MECHANICAL PROPERTIES; TENSILE PROPERTIES; ELASTICITY; DEFORMATION.)

AD-273 418 62-2-5 DIV. 20
GENERAL DYNAMICS/FORT WORTH, TEX.
(*RADIATION EFFECTS; X-RAYS; GAMMA RAYS; ALPHA PARTICLES; NEUTRONS; BETA PARTICLES; MATERIALS; METALS; SEMICONDUCTORS; OPTICAL MATERIALS; GLASS; PLASTICS; ELASTOMERS; ORGANIC MATERIALS; INORGANIC SUBSTANCES; ELECTRICAL EQUIPMENT; ELECTRONIC EQUIPMENT; ELECTRIC INSULATION.) (NUCLEAR REACTIONS; *STEEL; *ALUMINUM ALLOYS; *COPPER ALLOYS; *NICKEL ALLOYS; ALLOYS.) (RADIOBIOLOGY; *RADIATION HAZARDS; DOSAGE.) (AIRCRAFT; NUCLEAR PROPULSION.)

***RADIATION HAZARDS**

AD-273 193 62-2-5 DIV. 22
AIR FORCE PROVING GROUND COMMAND, EGLIN AIR FORCE BASE, FLA.
(*AIRCRAFT FIRE CONTROL SYSTEMS *FIRING ERROR INDICATORS; EFFECTIVENESS; RELIABILITY; TESTS.) (AERIAL TARGETS; TARGET DRONES; FIRING ERROR INDICATORS; AIRCRAFT AMMUNITION; *ROCKETS.) (FIRING ERROR INDICATORS; GAMMA RAYS; RADIOACTIVE ISOTOPES; RADIATION HAZARDS.) (PILOTS; *RADIATION HAZARDS.) (*PROJECTILES; RADIOACTIVITY; ROCKET TARGETS; TRACKING.)

AD-273 418 62-2-5 DIV. 20
GENERAL DYNAMICS/FORT WORTH, TEX.
(*RADIATION EFFECTS; X-RAYS; GAMMA RAYS; ALPHA PARTICLES; NEUTRONS; BETA PARTICLES; MATERIALS; METALS; SEMICONDUCTORS; OPTICAL MATERIALS; GLASS; PLASTICS; ELASTOMERS; ORGANIC MATERIALS; INORGANIC SUBSTANCES; ELECTRICAL EQUIPMENT; ELECTRONIC EQUIPMENT; ELECTRIC INSULATION.) (NUCLEAR REACTIONS; *STEEL; *ALUMINUM ALLOYS; *COPPER ALLOYS; *NICKEL ALLOYS; ALLOYS.) (RADIOBIOLOGY; *RADIATION HAZARDS; DOSAGE.) (AIRCRAFT; NUCLEAR PROPULSION.)

***RADIO COMMUNICATION SYSTEMS**

AD-273 068 62-2-5 DIV. 5
GENERAL MILLS, INC., MINNEAPOLIS, MINN.
(*SATELLITE VEHICLES FOR *COMMUNICATION SYSTEMS; *RADIO COMMUNICATION SYSTEMS.) (REFLECTION; SCATTERING OF MICROWAVES; RADIO WAVES FROM SATELLITE VEHICLES; *SPHERES; METALS.) (EFFECT OF GRAVITY; MAGNETIC FIELDS; ELECTROMAGNETIC FIELDS ON SATELLITE VEHICLES.) (DEFORMATION OF STRUCTURAL SHELLS FROM THERMAL STRESSES.) (FEASIBILITY STUDIES OF MATERIALS FOR SURFACES OF SATELLITE VEHICLES.) FEASIBILITY STUDIES OF CONFIGURATION FOR SATELLITE VEHICLES.

AD-273 111 62-2-5 DIV. 5
RADIATION, INC., MELBOURNE, FLA.
(*RADIO COMMUNICATION SYSTEMS *SECRET COMMUNICATION SYSTEMS; *RADIO RELAY SYSTEMS; ULTRA HIGH FREQUENCY; REFLECTORS; RELIABILITY; DESIGN; TESTS.) (COMMUNICATION EQUIPMENT; *RADAR CONFUSION REFLECTORS; *RADIO TRANSMISSION.) (RADIO SIGNALS; RADIO WAVES PROPAGATION; REFLECTION; SCATTERING.)

AD-273 133 62-2-5 DIV. 19
LABORATORY FOR ELECTRONICS, INC., BOSTON, MASS.
(*MINIATURE ELECTRONIC EQUIPMENT; MOBILE; *AIR TRAFFIC CONTROL SYSTEMS; *COMMUNICATION EQUIPMENT; RADIO NAVIGATION; TRAILERS.) (*RADIO COMMUNICATION SYSTEMS; TELETYPE EQUIPMENT; TRANSMITTER RECEIVERS; FACSIMILE RECEIVER CONVERTERS; FACSIMILE RECORDING SYSTEMS; MICROWAVE RELAY SYSTEMS; RADIO RELAY SYSTEMS; ULTRA HIGH FREQUENCY; VERY HIGH FREQUENCY; REDUCTION; PACKAGING; RELIABILITY.)

AD-273 196 62-2-5 DIV. 5
ROME AIR DEVELOPMENT CENTER, GRIFFISS AIR FORCE BASE, N. Y.
(*AIR FORCE COMMUNICATIONS; *RADIO COMMUNICATION SYSTEMS; RADIO ANTI-JAMMING; CORRELATION TECHNIQUES; DIVERSITY SYSTEMS.) (*RADIO TRANSMISSION; *MULTIPATH TRANSMISSION; MODULATION; SIGNAL-TO-NOISE RATIO; THEORY.) (RADIO RECEIVERS; RADIO TRANSMITTERS; SIDEBANDS.)

***RADIO RELAY SYSTEMS**

AD-273 111 62-2-5 DIV. 5
RADIATION, INC., MELBOURNE, FLA.
(*RADIO COMMUNICATION SYSTEMS *SECRET COMMUNICATION SYSTEMS; *RADIO RELAY SYSTEMS; ULTRA HIGH FREQUENCY; REFLECTORS; RELIABILITY; DESIGN; TESTS.) (COMMUNICATION EQUIPMENT; *RADAR CONFUSION REFLECTORS; *RADIO TRANSMISSION.) (RADIO SIGNALS; RADIO WAVES PROPAGATION; REFLECTION; SCATTERING.)

***RADIO TRANSMISSION**

AD-273 111 62-2-5 DIV. 5
RADIATION, INC., MELBOURNE, FLA.
(*RADIO COMMUNICATION SYSTEMS *SECRET COMMUNICATION SYSTEMS; *RADIO RELAY SYSTEMS; ULTRA HIGH FREQUENCY; REFLECTORS; RELIABILITY; DESIGN; TESTS.) (COMMUNICATION EQUIPMENT; *RADAR CONFUSION REFLECTORS; *RADIO TRANSMISSION.) (RADIO SIGNALS; RADIO WAVES PROPAGATION; REFLECTION; SCATTERING.)

AD-273 196 62-2-5 DIV. 5
ROME AIR DEVELOPMENT CENTER, GRIFFISS AIR FORCE BASE, N. Y.
(*AIR FORCE COMMUNICATIONS; *RADIO COMMUNICATION SYSTEMS; RADIO ANTI-JAMMING; CORRELATION TECHNIQUES; DIVERSITY SYSTEMS.) (*RADIO TRANSMISSION; *MULTIPATH TRANSMISSION; MODULATION; SIGNAL-TO-NOISE RATIO; THEORY.) (RADIO RECEIVERS; RADIO TRANSMITTERS; SIDEBANDS.)

***RADIO TRANSMITTERS**

AD-273 123 62-2-5 DIV. 8
AIRBORNE INSTRUMENTS LAB., INC., DEER PARK, LONG ISLAND, N. Y.
(*MICROWAVES; *RADIO TRANSMITTERS; MEASUREMENT; *DIPOLE ANTENNAS; CIRCUITS; ELECTRIC FIELDS; *WAVEGUIDES; TRANSMISSION LINES; *MICROWAVE NETWORKS.)

AD-273 272 62-2-5 DIV. 6
AIRBORNE INSTRUMENTS LAB., INC., DEER PARK, LONG ISLAND, N. Y.
(*RADAR TRANSMITTERS; *RADIO TRANSMITTERS; MICROWAVE FREQUENCY; *RADIO-FREQUENCY POWER; MEASUREMENT BY *WAVEMETERS; *MICROWAVE PROBES IN WAVEGUIDES; ANTENNA HORNS.) (*ELECTROMAGNETIC WAVES; TEST EQUIPMENT; WAVE CHARACTERISTICS; *MICROWAVES; ELECTRIC FIELDS; TRANSMISSION LINES; TESTS; MATHEMATICAL ANALYSIS.)

***RADIOACTIVATION ANALYSIS**

AD-273 262 62-2-5 DIV. 6
TRACERLAB, INC., *ALTHAM, MASS.
(*FEASIBILITY STUDY; *PROPELLANTS; *DETECTION IN THE ATMOSPHERE BY *RADIOACTIVATION ANALYSIS.) (GASES; *RADIOACTIVE ISOTOPES; KRYPTON; OXIDATION-REDUCTION REACTIONS.)

***RADIOACTIVE ISOTOPES**

AD-273 262 62-2-5 DIV. 6
TRACERLAB, INC., *ALTHAM, MASS.
(*FEASIBILITY STUDY; *PROPELLANTS; *DETECTION IN THE ATMOSPHERE BY *RADIOACTIVATION ANALYSIS.) (GASES; *RADIOACTIVE ISOTOPES; KRYPTON; OXIDATION-REDUCTION REACTIONS.)

***RADIOFREQUENCY GENERATORS**

AD-273 415 62-2-5 DIV. 8
ELECTRICAL ENGINEERING RESEARCH LAB., U. OF ILLINOIS, URBANA.
(*RADIOFREQUENCY GENERATORS, *MICROWAVES, *ELECTROMAGNETIC WAVES, *MICROWAVE FREQUENCY, *WAVE TRANSMISSION.) (ELECTRON BEAMS, *FREQUENCY MULTIPLIERS, FREQUENCY SHIFT, *CERENKOV RADIATION, *BREMSSTRAHLUNG.) (ELECTRONS, PLASMA PHYSICS, DIELECTRICS, *WAVEGUIDES.

***RADIOFREQUENCY POWER**

AD-273 239 62-2-5 DIV. 8
LINCOLN LAB., MASS. INST. OF TECH., LEXINGTON.
(*INFORMATION THEORY, FUNCTIONS, FOURIER ANALYSIS, INTEGRAL TRANSFORMS, *RADIOFREQUENCY POWER, PROBABILITY, RADIO SIGNALS)

AD-273 272 62-2-5 DIV. 8
AIRBORNE INSTRUMENTS LAB., INC., DEER PARK, LONG ISLAND, N. Y.
(*RADAR TRANSMITTERS, *RADIO TRANSMITTERS, MICROWAVE FREQUENCY, *RADIOFREQUENCY POWER, MEASUREMENT BY *WAVEMETERS, *MICROWAVE PROBES IN *WAVEGUIDES, ANTENNA HORNS.) (*ELECTROMAGNETIC WAVES, TEST EQUIPMENT, WAVE CHARACTERISTICS, *MICROWAVES, ELECTRIC FIELDS, TRANSMISSION LINES, TESTS, MATHEMATICAL ANALYSIS.)

***RADIOFREQUENCY SPECTRUM ANALYZERS**

AD-273 148 62-2-5 DIV. 30
PANORAMIC RADIO PRODUCTS, INC., MOUNT VERNON, N. Y.
(*RADIOFREQUENCY SPECTRUM ANALYZERS, HIGH FREQUENCY, *SIGNAL GENERATORS, AUDIOFREQUENCY, *TEST SETS, DESIGN.) (SIDE BANDS, RADIO TRANSMITTERS, TEST EQUIPMENT, TRANSISTORS, *NAVAL EQUIPMENT, SPECIFICATIONS.)

***RADIOGRAPHIC ANALYSIS**

AD-273 059 62-2-5 DIV. 23
ORDNANCE TANK-AUTOMOTIVE COMMAND, DETROIT, MICH.
(X RAYS, *RADIOGRAPHIC ANALYSIS, *BREMSSTRAHLUNG, *X-RAY SPECTRUM, ELECTROSTATICS.) (ELECTRONS, SCATTERING AND PHOTONS, ABSORPTION, ENERGY.) (VOLTAGE, BETATRONS, CYCLOTRON TARGETS.) (COMPUTERS, CODING.)

***RADIOGRAPHY**

AD-273 279 62-2-5 DIV. 20
WATERTOWN ARSENAL LABS., MASS.
(*THERMAL NEUTRONS, *NEUTRON BEAMS, *RADIOGRAPHY, INDUSTRIAL RADIOGRAPHY, ORDNANCE, MATERIALS.) FEASIBILITY STUDIES.

***RADIOMETERS**

AD-273 029 62-2-5 DIV. 8
ELECTRICAL ENGINEERING RESEARCH LAB., U. OF TEXAS, AUSTIN.
(*MICROWAVE SPECTROSCOPY, INSTRUMENTATION, TESTS, OXYGEN.) (*RADIOMETERS, ATMOSPHERIC REFRACTION, EXTREMELY HIGH FREQUENCY, *MICROWAVES, HIGH ALTITUDE, PROPAGATION.)

AD-273 056 62-2-5 DIV. 8
ANTENNA LAB., OHIO STATE U. RESEARCH FOUNDATION, COLUMBUS.
(*RADIOMETERS, X BAND, DIRECT CURRENT, ALTERNATING CURRENT, SWITCHING CIRCUITS, CALIBRATION, INSTRUMENTATION, TEST EQUIPMENT, DESIGN.) (*PARABOLIC ANTENNAS, NOISE (RADAR), NOISE (RADIO), REFLECTORS, ALUMINUM, GLASS TEXTILES, LENSES, MICROWAVES, REFLECTION, *RAE SCREENS, MEASUREMENT.)

AD-273 243 62-2-5 DIV. 8
LINCOLN LAB., MASS. INST. OF TECH., LEXINGTON.
(*COMMUNICATIONS THEORY, *STATISTICAL PROCESSES, *STATISTICAL FUNCTIONS, MATHEMATICAL ANALYSIS, TRANSFORMATIONS (MATHEMATICS), *FOURIER ANALYSIS, *SERIES.) (*RADIOMETERS, CALIBRATION, CIRCUITS, SIGNAL-TO-NOISE RATIO.)

***RADIOSONDES**

AD-273 303 62-2-5 DIV. 2
AIR FORCE CAMBRIDGE RESEARCH LABS., BEDFORD, MASS.
(*RADIOSONDES, BALLOONS, *METEOROLOGICAL DATA, TABLES, DRIFT.)

***RADOMES**

AD-273 237 62-2-5 DIV. 8
LINCOLN LAB., MASS. INST. OF TECH., LEXINGTON.
(RADAR EQUIPMENT, COMMUNICATION SYSTEMS, *RADOMES, BEAMS, STEEL, GLASS TEXTILES, *ATOMIC BOMB DAMAGE, BLAST, ELASTICITY, BUCKLING, DEFORMATION, MATHEMATICAL ANALYSIS, DIFFERENTIAL EQUATIONS, MODEL TESTS IN SHOCK TUBES.)

***RECORDING DEVICES**

AD-273 000 62-2-5 DIV. 2
TEXAS A. AND M. COLL., COLLEGE STATION.
(VELOCITY, DIRECTION FINDING OF *OCEAN CURRENTS, MEASUREMENT, FLORIDA, *RECORDING DEVICES.) (METERS, DESIGN, CONSTRUCTION, EXPERIMENTAL DATA.)

***RECTIFIERS**

AD-273 130 62-2-5 DIV. 8
INTERNATIONAL RECTIFIER CORP., LOS ANGELES, CALIF.
(*RECTIFIERS, *SILICON, *DIODES, ELECTRON TUBES, SEMICONDUCTORS, THERMODYNAMICS, TESTS, TEST METHODS, CIRCUIT TESTERS, RELIABILITY.)
DESIGN, PRODUCTION, *MANUFACTURING METHODS.

***RE-ENTRY AERODYNAMICS**

AD-273 072 62-2-5 DIV. 25
LINCOLN LAB., MASS. INST. OF TECH., LEXINGTON.
(ATMOSPHERE ENTRY, RE-ENTRY VEHICLES, *PLASMA PHYSICS, *RE-ENTRY AERODYNAMICS, *MAGNETOHYDRODYNAMICS.) (*ELECTROMAGNETIC FIELDS, *GAS IONIZATION, ELECTRONS, DENSITY, MEASUREMENT IN TURBULENT FLOW, *MACH SHOCK WAVES, ABLATION.) (*WAVE TRANSMISSION, REFLECTION, S BAND, ULTRA HIGH FREQUENCY, RADAR TRACKING, RADAR SIGNALS.) (TELEMETER SYSTEMS, DATA PROCESSING SYSTEMS, PROGRAMMING, DIGITAL COMPUTERS.) (INSTRUMENTATION, PHOTOGRAPHY, SCHLIEREN PHOTOGRAPHY, OPTICAL TRACKING.

AD-273 103 62-2-5 DIV. 9
CORNELL AERONAUTICAL LAB., INC., BUFFALO, N. Y.
(*RE-ENTRY AERODYNAMICS, *AERODYNAMIC HEATING, GASES, *NITROGEN, *OXYGEN, VIBRATION, *DISSOCIATION, RELAXATION TIME, REACTION KINETICS, THEORY.)

AD-273 110 62-2-5 DIV. 9
ROME U. (ITALY).
(*RE-ENTRY VEHICLES, ATMOSPHERE ENTRY, *ORBITAL FLIGHT PATHS, *RE-ENTRY AERODYNAMICS, *TRANSONICS, LIFT, DRAG.) (PERTURBATION THEORY, INTEGRATION.)

***RE-ENTRY VEHICLES**

AD-273 110 62-2-5 DIV. 9
ROME U. (ITALY).
(*RE-ENTRY VEHICLES, ATMOSPHERE ENTRY, *ORBITAL FLIGHT PATHS, *RE-ENTRY AERODYNAMICS, *TRANSONICS, LIFT, DRAG.) (PERTURBATION THEORY, INTEGRATION.)

AD-273 316 62-2-5 DIV. 9
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION, WASHINGTON, D. C.
(*RE-ENTRY VEHICLES, AERODYNAMIC HEATING, RE-ENTRY AERODYNAMICS, AERODYNAMICS, SUPERSONICS, AIRFRAMES, *THERMAL INSULATION *SHIELDING, COUNTERMEASURES, MODEL TESTS, *INDTUNNEL MODELS.)

***REFRACTORY MATERIALS**

AD-273 052 62-2-5 DIV. 26
WESTERN GEAR CORP., LYNWOOD, CALIF.
(*FORGING, ALLOYS, *HEAT RESISTANT ALLOYS, *REFRACTORY MATERIALS, *STEEL, STAINLESS STEEL, *TOOL STEEL, *TITANIUM ALLOYS.) (TEMPERATURE, PRESSURE, DEFORMATION, HEAT TREATMENT.) (MICROSTRUCTURE, TENSILE PROPERTIES, MECHANICAL PROPERTIES.) INDUSTRIAL EQUIPMENT.

AD-273 142 62-2-5 DIV. 17
NEW ENGLAND MATERIALS LAB., INC., MEDFORD, MASS.
(HEAT RESISTANT ALLOYS, *REFRACTORY MATERIALS, *DISPERSION HARDENING, OXIDATION, POWDER ALLOYS, POWDER METALS, *MOLYBDENUM ALLOYS, TITANIUM ALLOYS.) (MOLYBDENUM COMPOUNDS, TITANIUM COMPOUNDS, DIOXIDES, OXIDES, SINTERING, DIFFUSION.) ALLOYS, METALS.

AD-273 184 62-2-5 DIV. 17
DEFENSE METALS INFORMATION CENTER, COLUMBUS, OHIO.
(*BIBLIOGRAPHY, *HEAT RESISTANT ALLOYS, *METALS, *CERAMIC MATERIALS, *REFRACTORY MATERIALS, ALLOYS.) (STAINLESS STEEL, STEEL, IRON ALLOYS, NICKEL ALLOYS, BERYLLIUM, TITANIUM, MAGNESIUM, NIOBIUM, CHROMIUM, MOLYBDENUM, TANTALUM, VANADIUM, TUNGSTEN.) COATINGS.

AD-273 276 62-2-5 DIV. 14
VITRO LABS., WEST ORANGE, N. J.
(*REFRACTORY MATERIALS, *CERAMIC MATERIALS, PARTICLES, *POWDER METALS, PREPARATION, VAPORIZATION, CHEMICAL PROPERTIES, PHYSICAL PROPERTIES.) (OXIDES OF ALUMINUM COMPOUNDS, TUNGSTEN COMPOUNDS, MOLYBDENUM COMPOUNDS, IRON COMPOUNDS, MAGNESIUM COMPOUNDS, ZIRCONIUM COMPOUNDS, NIOBIUM COMPOUNDS, SILICON COMPOUNDS, THORIUM COMPOUNDS.) (METALS, MOLYBDENUM, TUNGSTEN, ALUMINUM.) (CARBIDES, TANTALUM COMPOUNDS.)

***REINFORCING MATERIALS**

AD-273 163 62-2-5 DIV. 14
WESTINGHOUSE ELECTRIC CORP., EAST PITTSBURGH, PA.
(*FILAMENT WOUND CONSTRUCTION, *EPOXY RESINS, POLYMERIZATION (SHRINKAGE), *REINFORCING MATERIALS, *GLASS PROCESSING.) (TESTS, HYDROSTATIC PRESSURE, TENSILE PROPERTIES, ELASTICITY, STRESSES, PHYSICAL PROPERTIES.)

AD-273 290 62-2-5 DIV. 14
BORDEN CO., PHILADELPHIA, PA.
(*ELASTOMERS, SYNTHETIC RUBBER, *SILICONES, *REINFORCING MATERIALS, HIGH TEMPERATURE RESEARCH.) (SILICONES, CHEMICAL REACTIONS, HYDROLYSIS, PHENYL RADICALS, CHLORIDES, SILANES OR CYANATES OR TITANIUM COMPOUNDS.) (MECHANICAL PROPERTIES, TENSILE PROPERTIES, ELASTICITY, VISCOSITY, HARDNESS, TEMPERATURE, STABILITY.)

***RELATIVITY THEORY**

AD-273 234 62-2-5 DIV. 4
HAMBURG U. (GERMANY).
(*GRAVITY OF THE *EARTH.) (GEOLOGY, PHYSICS, OCEANOGRAPHY, ASTRONOMY.) (*RELATIVITY THEORY, QUANTUM MECHANICS, TRANSFORMATIONS (MATHEMATICS), PERTURBATION THEORY.)

***RELIABILITY**

AD-273 286 62-2-5 DIV. 7
ARINC RESEARCH CORP., *WASHINGTON, D. C.
(*ELECTRICAL EQUIPMENT, MILITARY EQUIPMENT, *RELIABILITY, MATHEMATICAL PREDICTION.) (*ELECTRIC MOTORS, ALTERNATING CURRENT, DIRECT CURRENT, SYNCHRO RECEIVERS, *MOTOR GENERATORS, *SERVO MOTORS, *SYNCHROS, *FAILURE MECHANISMS, AIRBORNE, SHIPBORNE, BEARINGS, LUBRICATION, BRUSHES, ANALYSIS.)

***REMOTE CONTROL SYSTEMS**

AD-273 405 62-2-5 DIV. 5
FOREIGN TECH. DIV., AIR FORCE SYSTEMS COMMAND, WRIGHT-PATTERSON AIR FORCE BASE, OHIO.
(*REMOTE CONTROL SYSTEMS, COMMAND SYSTEMS, USSR.) COMMUNICATION SYSTEMS, PULSE GENERATORS, TRIGGER CIRCUITS, CONTROL SYSTEMS, CODING, SIGNALS, ELECTRIC RELAYS, MAGNETIC CORE SWITCHES.

***RESEARCH PROGRAM ADMINISTRATION**

AD-273 443 62-2-5 DIV. 30
SYLVANIA ELECTRIC PRODUCTS, INC., WALTHAM, MASS.
(*RESEARCH PROGRAM ADMINISTRATION, THEORY AND TEST METHODS OF MATHEMATICAL ANALYSIS, *MAPPING OF *SPEECH TRANSMISSION, *SIGNALS.) (ANALYSIS, SYNTHESIS OF DATA, SAMPLING.) (TIME, FUNCTIONS, SERIES, FOURIER ANALYSIS.) (PROGRAMMING, DIGITAL COMPUTERS, COMMUNICATIONS THEORY.)

***RESIN ADHESIVES**

AD-273 219 62-2-5 DIV. 14
GENERAL DYNAMICS/ASTRONAUTICS, SAN DIEGO, CALIF.
(*ADHESIVES, *RESIN ADHESIVES, EPOXY RESINS, NYLON, NITRILES, PHENOLIC RESINS, POLYMERS, AMIDES, URETHANES.) (BONDING OF ALLOYS, STAINLESS STEEL, ALUMINUM ALLOYS, TITANIUM ALLOYS, LAMINATES, GLASS TEXTILES, PHENOLIC RESINS, POLYMERS, ESTERS.) (CRYOGENICS, ADHESION, MECHANICAL PROPERTIES, SHEAR STRESSES, THICKNESS, ELASTICITY, TESTS.)

***RESISTORS**

AD-273 170 62-2-5 DIV. 8
GENERAL ELECTRIC CO., OWENSBORO, KY.
(ELECTRONIC CIRCUITS, HIGH TEMPERATURE RESEARCH, THERMIONIC EMISSION, RADIATION DAMAGE.) (CIRCUITS, *ELECTRON TUBES, *DIODES, TRIODES, ELECTRICAL PROPERTIES, MECHANICAL PROPERTIES, PROCESSING, MATERIALS, SHOCK RESISTANCE, LIFE EXPECTANCY, TITANIUM.) (*RESISTORS, *CARBON RESISTORS, MATERIALS, TUNGSTEN, MOLYBDENUM, LIFE EXPECTANCY.) (*CAPACITORS, MATERIALS, DIELECTRICS, CERAMIC MATERIALS, *VARIABLE CAPACITORS, *MICA CAPACITORS.) TEST EQUIPMENT.

AD-273 172 62-2-5 DIV. 8
DAVISON CHEMICAL CO., BALTIMORE, MD.
(PRODUCTION, MANUFACTURING METHODS, *RESISTORS, *THERMISTORS, *SEMICONDUCTORS OF SINGLE CRYSTALS OF *SILICON WITH CHEMICAL IMPURITIES, GOLD, DIFFUSION, ALUMINUM, ELECTRODES.) ZONE MELTING.

•ROCKET CASES

AD-273 093 62-2-5 DIV. 27
AEROJET-GENERAL CORP., SACRAMENTO, CALIF.
(GUIDED MISSILES, SURFACE TO SURFACE, ROCKET MOTORS.) (•ROCKET CASES, •STEEL (D-6AC), STRUCTURES, STRESSES, ANALYSIS, MEASUREMENT, ELLIPSOIDS, CYLINDRICAL BODIES, DEFLECTION, DEFORMATION, HYDROSTATIC PRESSURE, TENSILE PROPERTIES, FAILURE (MECHANICS), DESIGN.) (TEST EQUIPMENT, STRAIN GAGES.)

AD-273 297 62-2-5 DIV. 27
DEFENSE METALS INFORMATION CENTER, COLUMBUS, OHIO.
(•ROCKET CASES, MATERIALS, •STEEL, •TITANIUM ALLOYS, LAMINATES, FILAMENT WOUND CONSTRUCTION, GLASS TEXTILES, PLASTICS, EFFECTIVENESS, DESIGN.) (STRESSES, DEFORMATION, MECHANICAL PROPERTIES, PHYSICAL PROPERTIES, BUCKLING, ELASTICITY, DENSITY.)

•ROCKET MOTOR NOZZLES

AD-273 073 62-2-5 DIV. 27
LOCKHEED AIRCRAFT CORP., SUNNYVALE, CALIF.
(•ROCKET MOTORS, •ROCKET MOTOR NOZZLES, •PRESSURE VESSELS, PLASTICS, MATERIALS, FILAMENT WOUND CONSTRUCTION, JATOS.) •BIBLIOGRAPHY.

AD-273 082 62-2-5 DIV. 17
NATIONAL RESEARCH CORP., CAMBRIDGE, MASS.
(•TANTALUM ALLOYS, •TUNGSTEN ALLOYS, •ROCKET MOTOR NOZZLES, ALLOYS, CARBONIZATION, TANTALUM COMPOUNDS, TUNGSTEN COMPOUNDS, CARBIDES, PROCESSING.) (MECHANICAL PROPERTIES, PHYSICAL PROPERTIES, TENSILE PROPERTIES, TRANSITION TEMPERATURE, MELTING TEMPERATURE, THERMAL CONDUCTIVITY, THERMAL EXPANSION, MICROSTRUCTURE.) (EXHAUST NOZZLES, CONTROL SURFACES, EROSION BY EXHAUST GASES, TESTS.) HEAT RESISTANT ALLOYS.

AD-273 319 62-2-5 DIV. 27
NAVAL ORDNANCE TEST STATION, CHINA LAKE, CALIF.
(GUIDED MISSILES, CONTROL AND SPACE FLIGHT, •CONTROL SYSTEMS USING JETS, INJECTION OF GASES, LIQUIDS INTO •ROCKET MOTOR NOZZLES FOR DEFLECTION OF EXHAUST GASES, THRUST.) (TESTS USING WATER, NITROGEN, TETROXIDES, NITRIC ACID.)

AD-273 333 62-2-5 DIV. 27
UNITED NUCLEAR CORP., •WHITE PLAINS, N. Y.
(•ROCKET MOTOR NOZZLES, SOLID ROCKET PROPELLANTS, COOLING, •SWEAT COOLING AND •FILM COOLING WITH GASES AND LIQUIDS, DESIGN, TESTS, MATHEMATICAL ANALYSIS, MANUFACTURING METHODS.) (COOLANTS, PHYSICAL PROPERTIES, HANDLING, STORAGE.) (MATERIALS, METALS, REFRACTORY MATERIALS, PHYSICAL PROPERTIES.) (TURBULENT BOUNDARY LAYER, HEAT TRANSFER, MATHEMATICAL ANALYSIS, TESTS.)

AD-273 430 62-2-5 DIV. 27
ARDE-PORTLAND, INC., PANAMUS, N. J.
(ROCKET MOTORS, SOLID ROCKET PROPELLANTS, •ROCKET MOTOR NOZZLES, ADAPTERS FOR INSTALLATION, COOLING, FILM COOLING, CONVECTION, LIQUID COOLED, TESTS, DESIGN, TEST METHODS.) (COOLANTS, LIQUID METALS, LITHIUM, PHYSICAL PROPERTIES, HANDLING, TEST EQUIPMENT.) (LITHIUM, ELECTROMAGNETIC PUMPS, FLOWMETERS, TESTS.) (SPRAY NOZZLES, FILM COOLING, TEST EQUIPMENT.)

•ROCKET MOTORS

AD-273 073 62-2-5 DIV. 27
LOCKHEED AIRCRAFT CORP., SUNNYVALE, CALIF.
(•ROCKET MOTORS, •ROCKET MOTOR NOZZLES, •PRESSURE VESSELS, PLASTICS, MATERIALS, FILAMENT WOUND CONSTRUCTION, JATOS.) •BIBLIOGRAPHY.

AD-273 435 62-2-5 DIV. 12
BOEING CO., SEATTLE, WASH.
(•ROCKET MOTORS, •EXHAUST GASES, •EXHAUST FLAMES, DETECTION, •WIND TUNNELS, •TESTS, INFRARED RADIATION, SPECTROGRAPHIC ANALYSIS, MEASUREMENT.) (ALTITUDE CHAMBERS, SIMULATION.) (INSTRUMENTATION, RADIOMETERS, SPECTROPHOTOMETERS.) (EXPERIMENTAL DATA, TABLES.) (LIQUID ROCKET PROPELLANTS, SOLID ROCKET PROPELLANTS.)

•ROCKET PLANES

AD-273 209 62-2-5 DIV. 1
CHANCE VOUGHT CORP., DALLAS, TEX.
(•JET PLANES, •ROCKET PLANES, •HYPERVELOCITY VEHICLES, NAVAL AIRCRAFT, CONTROL SYSTEMS, SERVO SYSTEMS, HYDRAULIC SERVOMECHANISMS, •HYDRAULIC SYSTEMS, DESIGN, PACKAGING, HIGH TEMPERATURE RESEARCH, INSTALLATION.) (HYDRAULIC VALVES, HYDRAULIC SEALS, METAL SEALS, DESIGN, MATERIALS, PACKAGING, TESTS, TEST METHODS.)

AD-273 210 62-2-5 DIV. 1
CHANCE VOUGHT CORP., DALLAS, TEX.
(•JET PLANES, •ROCKET PLANES, •HYPERVELOCITY VEHICLES, NAVAL AIRCRAFT, CONTROL SYSTEMS, SERVO SYSTEMS, HYDRAULIC SERVOMECHANISMS, •HYDRAULIC SYSTEMS, DESIGN, PACKAGING, HIGH TEMPERATURE RESEARCH, INSTALLATION.) (HYDRAULIC FLUID FILTERS, DESIGN, SPECIFICATONS, STANDARDS, TEST METHODS, QUALITY CONTROL.)

AD-273 211 62-2-5 DIV. 1
CHANCE VOUGHT CORP., DALLAS, TEX.
(•JET PLANES, •ROCKET PLANES, •HYPERVELOCITY VEHICLES, NAVAL AIRCRAFT, CONTROL SYSTEMS, SERVO SYSTEMS, HYDRAULIC SERVOMECHANISMS, •HYDRAULIC SYSTEMS, DESIGN, PACKAGING, HIGH TEMPERATURE RESEARCH, INSTALLATION, MATERIALS, COSTS, RELIABILITY.) (HYDRAULIC COUPLINGS, HYDRAULIC CONDUITS, DESIGN, TESTS, MANUFACTURING METHODS.)

AD-273 212 62-2-5 DIV. 1
CHANCE VOUGHT CORP., DALLAS, TEX.
(•JET PLANES, •ROCKET PLANES, •HYPERVELOCITY VEHICLES, NAVAL AIRCRAFT, •HYDRAULIC SYSTEMS, CONTROL SYSTEMS, SERVO SYSTEMS, HYDRAULIC SERVOMECHANISMS, DESIGN, PACKAGING, HIGH TEMPERATURE RESEARCH, INSTALLATION.) (METAL SEALS, HYDRAULIC SEALS, HYDRAULIC VALVES, HYDRAULIC CONDUITS, HYDRAULIC ACTUATORS, MATERIALS, MANUFACTURING METHODS, TESTS, RELIABILITY.) (METALS, STAINLESS STEEL, PHYSICAL PROPERTIES.)

•ROCKETS

AD-273 193 62-2-5 DIV. 22
AIR FORCE PROVING GROUND COMMAND, EGLIN AIR FORCE BASE, FLA.
(•AIRCRAFT FIRE CONTROL SYSTEMS, •FIRING ERROR INDICATORS, EFFECTIVENESS, RELIABILITY, TESTS.) (AERIAL TARGETS, TARGET DRONES, FIRING ERROR INDICATORS, AIRCRAFT AMMUNITION, •ROCKETS.) (FIRING ERROR INDICATORS, GAMMA RAYS, RADIOACTIVE ISOTOPES, RADIATION HAZARDS.) (PILOTS, •RADIATION HAZARDS.) (•PROJECTILES, RADIOACTIVITY, ROCKET TARGETS, TRACKING.)

•ROLLING MILLS

AD-273 020 62-2-5 DIV. 17
FANSTEEL METALLURGICAL CORP., NORTH CHICAGO, ILL.
(PRODUCTION AND PROCESSING OF •TUNGSTEN, •SHEETS.) (•MANUFACTURING METHODS, PREPARATION OF POWDER METALS BY HYDROGEN REDUCTION OF AMMONIUM RADICALS, TUNGSTATES BY POWDER METALLURGY, SINTERING AND •ROLLING MILLS.) (TRANSITION TEMPERATURE, HEAT TREATMENT, DEFORMATION, MECHANICAL PROPERTIES, TENSILE PROPERTIES.)

•RUBIDIUM

AD-273 076 62-2-5 DIV. 2
MASSACHUSETTS INST. OF TECH., CAMBRIDGE.
(METEORITES, •MINERALS, •GEOCHEMISTRY, •ISOTOPES, RADIOACTIVE ISOTOPES, •STRONTIUM, •RUBIDIUM, AUSTRALIA, INDOCHINA INDONESIA, PHILIPPINE ISLANDS, NORTH AMERICA, CZECHOSLOVAKIA.) CHEMICAL ANALYSIS, MASS SPECTROSCOPY, X-RAY SPECTROSCOPY, FLUORESCENCE.

•SAFETY

AD-273 144 62-2-5 DIV. 1
NATIONAL AVIATION FACILITIES EXPERIMENTAL CENTER, ATLANTIC CITY, N. J.
(•AIRPLANE LANDINGS, •VOICE COMMUNICATION SYSTEMS, •AIR TRAFFIC CONTROL SYSTEMS, •AUTOMATIC NAVIGATORS, •FLIGHT SIMULATORS, WEIGHT FINDING, DIRECTION FINDING, DETECTION, DISPLAY SYSTEMS, GLIDE PATH SYSTEMS, APPROACH LIGHTS, RUNWAYS, GROUND SPEED INDICATORS, RADIO COMMUNICATION SYSTEMS, PARAMETRIC AMPLIFIERS, •DATA PROCESSING SYSTEMS, DISPLAY SYSTEMS, RADAR EQUIPMENT, DOPPLER SYSTEMS, ANTENNAS, DIRECTION FINDING, •SAFETY, SIMULATION, THEORY, GROUND CONTROLLED APPROACH RADAR.

•SAMPLING

AD-273 235 62-2-5 DIV. 30
LITTON SYSTEMS, INC., •WALTHAM, MASS.
(•PROGRAMMING, PATTERN RECOGNITION, •SAMPLING, •DATA PROCESSING SYSTEMS, AUTOMATIC, DECISION THEORY, •STATISTICAL ANALYSIS,) (DIGITAL COMPUTERS, TESTS, SIGNAL-TO-NOISE RATIO.) (INTEGRAL EQUATIONS, MATRIX ALGEBRA, TIME, •TRANSFORMATIONS (MATHEMATICS), SEQUENCES, TAYLOR'S SERIES, STATISTICAL DISTRIBUTIONS, PROBABILITY, INEQUALITIES.)

AD-273 343 62-2-5 DIV. 30
CALIFORNIA U., LOS ANGELES.
(ANALYSIS OF •DATA PROCESSING SYSTEMS, •SAMPLING, FEEDBACK, CONTROL SYSTEMS.) (•DIFFERENCE EQUATIONS, TRANSFORMATIONS (MATHEMATICS), INTEGRATION, MATRIX ALGEBRA.)

•SANDWICH PANELS

AD-273 137 62-2-5 DIV. 14
AEROELASTIC AND STRUCTURES RESEARCH LAB., MASS. INST. OF TECH., CAMBRIDGE.
(SHEETS, METAL PLATES, •GLASS TEXTILES, LAMINATES, •SANDWICH PANELS, •ALUMINUM ALLOYS, FOILS, •STRESSES, LOADING, •FAILURE (MECHANICS), THEORY, MATHEMATICAL ANALYSIS, PROGRAMMING.) (RADOMES, STRUCTURES.) (TEST METHODS, HIGH PRESSURE RESEARCH, HYDROSTATIC PRESSURE, SHOCK WAVES, TEST EQUIPMENT, SHOCK TUBES.)

•SATELLITE ATTITUDE

AD-273 023 62-2-5 DIV. 12
SPACE TECHNOLOGY LABS., INC., LOS ANGELES, CALIF.
(•SATELLITE VEHICLES, INTERNAL MOVING PARTS, •VIBRATION, ROTATION, •SATELLITE ATTITUDE, VECTOR ANALYSIS, ACCELERATION, TORQUE, MOMENTS, (FORCE),) (MATRIX ALGEBRA, DIFFERENTIAL EQUATIONS.)

•SATELLITE VEHICLE TRAJECTORIES

AD-273 087 62-2-5 DIV. 12
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION, WASHINGTON, D. C.
(FEASIBILITY STUDIES, MANNED, •CONICAL BODIES, BLUNT BODIES, •SATELLITE VEHICLES, RE-ENTRY VEHICLES, AERODYNAMIC CONFIGURATIONS, •SATELLITE VEHICLE TRAJECTORIES, TERMINAL BALLISTICS, ATMOSPHERE ENTRY, AERODYNAMIC HEATING, RE-ENTRY AERODYNAMICS, DYNAMICS, DECELERATION, ACCELERATION TOLERANCE, RECOVERY, MATHEMATICAL ANALYSIS.)

•SATELLITE VEHICLES

AD-273 023 62-2-5 DIV. 12
SPACE TECHNOLOGY LABS., INC., LOS ANGELES, CALIF.
(•SATELLITE VEHICLES, INTERNAL MOVING PARTS, •VIBRATION, ROTATION, •SATELLITE ATTITUDE, VECTOR ANALYSIS, ACCELERATION, TORQUE, MOMENTS, (FORCE),) (MATRIX ALGEBRA, DIFFERENTIAL EQUATIONS.)

AD-273 068 62-2-5 DIV. 5
GENERAL MILLS, INC., MINNEAPOLIS, MINN.
(•SATELLITE VEHICLES FOR •COMMUNICATION SYSTEMS, •RADIO COMMUNICATION SYSTEMS,) (REFLECTION, SCATTERING OF MICROWAVES, RADIO WAVES FROM SATELLITE VEHICLES, •SPHERES, METALS,) (EFFECT OF GRAVITY, MAGNETIC FIELDS, ELECTROMAGNETIC FIELDS ON SATELLITE VEHICLES.) (DEFORMATION OF STRUCTURAL SHELLS FROM THERMAL STRESSES.) (FEASIBILITY STUDIES OF MATERIALS FOR SURFACES OF SATELLITE VEHICLES.) FEASIBILITY STUDIES OF CONFIGURATION FOR SATELLITE VEHICLES.

AD-273 087 62-2-5 DIV. 12
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION, WASHINGTON, D. C.
(FEASIBILITY STUDIES, MANNED, •CONICAL BODIES, BLUNT BODIES, •SATELLITE VEHICLES, RE-ENTRY VEHICLES, AERODYNAMIC CONFIGURATIONS, •SATELLITE VEHICLE TRAJECTORIES, TERMINAL BALLISTICS, ATMOSPHERE ENTRY, AERODYNAMIC HEATING, RE-ENTRY AERODYNAMICS, DYNAMICS, DECELERATION, ACCELERATION TOLERANCE, RECOVERY, MATHEMATICAL ANALYSIS.)

AD-273 099 62-2-5 DIV. 2
BOEING CO., SEATTLE, WASH.
(•INFRARED RADIATION FROM ATMOSPHERE AS BACKGROUND FOR •SATELLITE VEHICLES.) (REFLECTION, SCATTERING OF INFRARED RADIATION FROM AIR, CLOUDS, SUN, EARTH,) (CARBON DIOXIDE, OZONE, •WATER VAPOR, ICE, CIRRUS CLOUDS,) (AEROSOLS IN STRATOSPHERE.) (ATMOSPHERE, MOLECULES, ABSORPTION.)

AD-273 134 62-2-5 DIV. 12

LINCOLN LAB., MASS. INST. OF TECH., LEXINGTON
(•GUIDED MISSILES, •FLIGHT PATHS, ANALYSIS, AERODYNAMICS, EARTH, GRAVITY,) (VELOCITY AND ACCELERATION OF •SATELLITE VEHICLES,) (HEAT TRANSFER, TURBULENCE, BOUNDARY LAYER,) (EQUATIONS OF MOTION, TRANSFORMATIONS (MATHEMATICS),) (DIGITAL COMPUTERS, EXPERIMENTAL DATA,)

AD-273 273 62-2-5 DIV. 5
PHILCO CORP., BLUE BELL, PA.
(•LIGHT COMMUNICATION SYSTEMS •OPTICAL TRACKING, COMMUNICATION SYSTEMS, TRACKING, •SATELLITE VEHICLES, •LUNAR PROBE, •SPACESHIPS, COMMUNICATIONS THEORY,) (SATELLITE ATTITUDE, GYROSCOPES, ORBITAL FLIGHT PATHS,) (SATELLITE ATTITUDE, STABILIZATION) (TRACKING WITH THIN FILMS, DETECTORS,) (SATELLITE VEHICLES, ATTITUDES, CONFIGURATIONS,) SIGNAL-TO-NOISE RATIO, PHOTOMULTIPLIERS.

AD-273 338 62-2-5 DIV. 12
NORTHROP CORP., HAWTHORNE, CALIF.
(•SATELLITE VEHICLES, •GUIDED MISSILES, •BOOSTER ROCKETS, DYNAMICS, •VIBRATION, FATIGUE (MECHANICS), AIRFRAMES, STRUCTURES,) (VIBRATION FROM ROCKET MOTOR NOISE, EXHAUST GASES, TURBULENT BOUNDARY LAYER, OSCILLATION OF SHOCK WAVES, FLUTTER, TURBULENCE OF

ATMOSPHERE• •SiO• METEORITES• COMBUSTION OF ROCKET MOTORS.) (VIBRATION• FATIGUE (MECHANICS)• MATHEMATICAL ANALYSIS• INTEGRAL EQUATIONS• ANALYSIS• TEST METHODS• EXPERIMENTAL DATA.) AERODYNAMICS• GROUND EFFECT.

•SCATTERING

AD-273 149 62-2-5 DIV. 25
MICROWAVE RESEARCH INST.• POLYTECHNIC INST. OF BROOKLYN• N. Y.
(•ELECTROMAGNETIC WAVES• •SCATTERING• •PLASMA PHYSICS• COMPRESSION SHOCK• ACOUSTICS• OPTICS• WAVE TRANSMISSION• AIR.) (GAS IONIZATION• MAGNETIC FIELDS• REFLECTION• SURFACE PROPERTIES• •PROPAGATION.) (DIFFERENTIAL EQUATIONS• TRANSFORMATIONS (MATHEMATICS)• PARTIAL DIFFERENTIAL EQUATIONS.)

AD-273 257 62-2-5 DIV. 8
NAVAL RESEARCH LAB.• WASHINGTON• D. C.
(•MICROWAVES• •PROPAGATION• •SCATTERING• PACIFIC OCEAN.) (X BAND• S BAND.)

•SCHEDULING

AD-273 207 62-2-5 DIV. 15
BOEING SCIENTIFIC RESEARCH LABS.• SEATTLE• WASHINGTON.
(STATISTICAL DISTRIBUTIONS• •SCHEDULING• PROBABILITY• •NUMERICAL METHODS AND PROCEDURES• TRANSFORMATIONS (MATHEMATICS).)

•SCIENTIFIC RESEARCH

AD-273 030 62-2-5 DIV. 1
PRINCETON U.• N. J.
(•MILITARY AIRCRAFT• •MILITARY RESEARCH• •SCIENTIFIC RESEARCH• RESEARCH PROGRAM ADMINISTRATION.) (•VERTICAL TAKE-OFF PLANES• SHORT TAKE-OFF PLANES• •FLYING PLATFORMS• HELICOPTERS• GROUND EFFECT• STABILITY• CONTROL• MODEL TESTS• THEORY• MATHEMATICAL ANALYSIS.) (AIRCRAFT• AIRPLANES• ELECTRICAL PROPERTIES• THEORY.) (TEST FACILITIES• WIND TUNNELS• DESIGN.) •BIBLIOGRAPHY.

•SEARCH RADAR

AD-273 074 62-2-5 DIV. 6
LOCKHEED AIRCRAFT CORP.• SUNNYVALE• CALIF.
(•RADAR• RADAR RANGES• •RADAR TRACKING• RADAR DECEPTION• COUNTERMEASURES• DOPPLER RADAR• •SEARCH RADAR• •RADAR SIGNAL• •RADAR PULSES.) •BIBLIOGRAPHY.

•SECRET COMMUNICATION SYSTEMS

AD-273 111 62-2-5 DIV. 5
RADIATION• INC.• MELBOURNE• FLA.
(•RADIO COMMUNICATION SYSTEMS •SECRET COMMUNICATION SYSTEMS• •RADIO RELAY SYSTEMS• ULTRA HIGH FREQUENCY• REFLECTORS• RELIABILITY• DESIGN• TESTS.) (COMMUNICATION EQUIPMENT• •RADAR CONFUSION REFLECTORS• •RADIO TRANSMISSION.) (RADIO SIGNALS• RADIO WAVES PROPAGATION• REFLECTION• SCATTERING.)

•SEDIMENTATION

AD-273 258 62-2-5 DIV. 2
NAVAL ORDNANCE TEST STATION• CHINA LAKE• CALIF.
(•OCEANOGRAPHY AND OCEAN BOTTOM• ANALYSIS OF •BEACHES ALONG SOUTH CHINA SEA• EGYPT• TAIWAN• KOREA• IRAN• ARABIA• FINLAND AND USSR.) (•GEOGRAPHY• HISTORY• GEOLOGY AND METEOROLOGY.) (METEOROLOGICAL DATA• •OCEANOGRAPHICAL DATA AND •SEDIMENTATION.) ANTISUBMARINE WARFARE.

•SEISMIC WAVES

AD-273 114 62-2-5 DIV. 2
MASSACHUSETTS INST. OF TECH.• CAMBRIDGE.
(•SEISMIC WAVES• •SEISMOGRAPHS• SPECTROGRAPHIC ANALYSIS.) (MAGNETIC TAPES• SEISMOGRAPHS• •DIGITAL SYSTEMS.) (UNDERGROUND EXPLOSIONS• DETECTION.)

AD-273 402 62-2-5 DIV. 25
FOREIGN TECH. DIV.• AIR FORCE SYSTEMS COMMAND• WRIGHT-PATTERSON AIR FORCE BASE• OHIO.
(•SEISMIC WAVES• PROPAGATION• •UNDERGROUND EXPLOSIONS• USSR• WAVE TRANSMISSION.) (SOLIDS• •DEMOLITION.)

•SEISMOGRAPHS

AD-273 114 62-2-5 DIV. 2
MASSACHUSETTS INST. OF TECH.• CAMBRIDGE.
(•SEISMIC WAVES• •SEISMOGRAPHS• SPECTROGRAPHIC ANALYSIS.) (MAGNETIC TAPES• SEISMOGRAPHS• •DIGITAL SYSTEMS.) (UNDERGROUND EXPLOSIONS• DETECTION.)

•SELECTION

AD-273 449 62-2-5 DIV. 23
DUNLAP AND ASSOCIATES• INC.• STAMFORD• CONN.
(•TRAINING• EFFECTIVENESS OF •AVIATION PERSONNEL FOR SPACE FLIGHT• SIMULATION.) •SELECTION• STRESS (PSYCHOLOGY).

•SELENIUM COMPOUNDS

AD-273 048 62-2-5 DIV. 4
AEROSPACE CORP.• LOS ANGELES• CALIF.
(•FLUORIDES OR •OXYFLUORIDES OF •SULFUR COMPOUNDS• •SELENIUM COMPOUNDS• •TELLURIUM COMPOUNDS• SYNTHESIS• CHEMICAL REACTIONS• PHYSICAL PROPERTIES• THERMODYNAMICS• HEAT OF FORMATION.)

•SEMICONDUCTING FILMS

AD-273 218 62-2-5 DIV. 25
ARIZONA STATE U.• TEMPE.
(•SEMICONDUCTING FILMS• •SEMICONDUCTORS• MATERIALS• CERAMIC MATERIALS• •TITANIUM COMPOUNDS• DIOXIDES• COLLOIDS• IMPURITIES• CONDUCTIVITY• •THERMOELECTRICITY• HIGH TEMPERATURE RESEARCH• STABILITY• CRYSTALS• SINGLE CRYSTALS.) •CRYSTAL RECTIFIERS.

•SEMICONDUCTORS

AD-273 066 62-2-5 DIV. 25
ADVANCED ELECTRONICS CENTER• GENERAL ELECTRIC CO.• ITHACA• N. Y.
(•WAVEGUIDES• •SEMICONDUCTORS• PHOTOELECTRIC SHUTTERS• •DIELECTRIC PROPERTIES.) (ANTENNAS• METALLIC CRYSTALS• DIODES.) (MICROWAVES• •CAPACITANCE BRIDGES.)

AD-273 138 62-2-5 DIV. 8
MOTOROLA• INC.• PHOENIX• ARIZ.
(•TRANSISTORS• •DIELECTRICS• •GERMANIUM• •SILICON• •SEMICONDUCTORS• SURFACES• SURFACE PROPERTIES• DIELECTRIC PROPERTIES.) (PROCESSING• AGING• ENCAPSULATION• CONTROLLED ATMOSPHERES• CONTROL OF WATER VAPOR WITH BARIUM COMPOUNDS• OXIDES• NITROGEN• OXYGEN• HYDROGEN COMPOUNDS• BORON COMPOUNDS• DIOXIDES.) (OXIDATION• SILICON• SILICON COMPOUNDS• DIOXIDES• TEMPERATURE.)

AD-273 172 62-2-5 DIV. 8
DAVISON CHEMICAL CO.• BALTIMORE• MD.
(PRODUCTION• MANUFACTURING METHODS• •RESISTORS• •THERMISTORS• •SEMICONDUCTORS OF SINGLE CRYSTALS OF •SILICON •ITH CHEMICAL IMPURITIES• GOLD• DIFFUSION• ALUMINUM• ELECTRODES.) ZONE MELTING.

AD-273 218 62-2-5 DIV. 25
ARIZONA STATE U.• TEMPE.
(•SEMICONDUCTING FILMS• •SEMICONDUCTORS• MATERIALS• CERAMIC MATERIALS• •TITANIUM COMPOUNDS• DIOXIDES• COLLOIDS• IMPURITIES• CONDUCTIVITY• •THERMOELECTRICITY• HIGH TEMPERATURE RESEARCH• STABILITY• CRYSTALS• SINGLE CRYSTALS.) •CRYSTAL RECTIFIERS.

•SENSITIVITY

AD-273 024 62-2-5 DIV. 30
MICROWAVE RESEARCH INST.• POLYTECHNIC INST. OF BROOKLYN• N. Y.
(•FEEDBACK• •SENSITIVITY• FUNCTIONS• SIGNAL-TO-NOISE RATIO• •ERRORS.) (•MATHEMATICAL LOGIC• •CONTROL SYSTEMS• RELIABILITY• DESIGN.) (NONLINEAR SYSTEMS• COMMUTATORS• EXPERIMENTAL DATA• TABLES.)

•SERIES

AD-273 243 62-2-5 DIV. 8
LINCOLN LAB.• MASS. INST. OF TECH.• LEXINGTON•
(•COMMUNICATIONS THEORY• •STATISTICAL PROCESSES• •STATISTICAL FUNCTIONS• MATHEMATICAL ANALYSIS• TRANSFORMATIONS (MATHEMATICS)• •FOURIER ANALYSIS• •SERIES.) (•RADIOMETERS• CALIBRATION• CIRCUITS• SIGNAL-TO-NOISE RATIO.)

•SERVO MOTORS

AD-273 286 62-2-5 DIV. 7
ARINC RESEARCH CORP.• WASHINGTON• D. C.
(•ELECTRICAL EQUIPMENT• MILITARY EQUIPMENT• •RELIABILITY• MATHEMATICAL PREDICTION.) (•ELECTRIC MOTORS• ALTERNATING CURRENT• DIRECT CURRENT• SYNCHRO RECEIVERS• •MOTOR GENERATORS• •SERVO MOTORS• •SYNCHROS• •FAILURE (MECHANICS)• AIRBORNE• SHIPBORNE• BEARINGS• LUBRICATION• BRUSHES• ANALYSIS.)

•SHAPED CHARGES

AD-273 277 62-2-5 DIV. 22
DAVIDSON LAB.• STEVENS INST. OF TECH.• HOBOKEN N. J.
(•EXPLOSIVES• CESIUM COMPOUND• ADDITIVES• •EXPLOSIONS• ELECTRICAL CONDUCTANCE• RESISTANCE• ELECTRICAL PROPERTIES• MEASUREMENT.) (•SHAPE) CHARGES• PENETRATION• COPPER• TARGETS• SPECTROGRAPHIC ANALYSIS• PHOTOGRAPHIC ANALYSIS.) (•CAPACITORS• DESIGN• TESTS.)

•SHEETS

AD-273 020 62-2-5 DIV. 17
FANSTEEL METALLURGICAL CORP.• NORTH CHICAGO• ILL.
(PRODUCTION AND PROCESSING OF •TUNGSTEN• •SHEETS.) (•MANUFACTURING METHODS• PREPARATION OF POWDER METALS BY HYDROGEN• REDUCTION OF AMMONIUM RADICALS• TUNGSTATES BY POWDER •TI- TALLURGY• SINTERING AND •ROLLING MILLS.•) (TRANSITION TEMPERATURE• HEAT TREATMENT• DEFORMATION• MECHANICAL PROPERTIES• TENSILE PROPERTIES.•)

AD-273 038 62-2-5 DIV. 17
ARMOUR RESEARCH FOUNDATION• CHICAGO• ILL.
(•TITANIUM ALLOYS• •SHEETS• •WELDING• HEAT TREATMENT• ELECTROMAGNETIC EFFECTS• VIBRATION• AGING.) (ARC WELDING• MAGNETIC WAVES• ABSORPTION• EXCITATION.) (FOURIER ANALYSIS• INTEGRAL TRANSFORMS• PERTURBATION THEORY• PROBABILITY.)

AD-273 040 62-2-5 DIV. 17
UNIVERSAL-CYCLOPS STEEL CORP.• BRIDGEVILLE• PA.
(PROCESSING• •SHEETS• •MOLYBDENUM ALLOYS• TITANIUM ALLOYS AND ZIRCONIUM ALLOYS (TZM)• MELTING• CASTING• FORGING• EXTRUSION• ROLLING MILLS• HEAT TREATMENT.) (MICROSTRUCTURE• GRAINS (METALLURGY)• CARBIDES• TRANSITION TEMPERATURE• TENSILE PROPERTIES• DEFORMATION• TESTS.)

AD-273 165 62-2-5 DIV. 17
REACTIVE METALS• INC.• NILES• OHIO.
(MANUFACTURING METHODS• PRODUCTION• PROCESSING• METAL PLATES• •SHEETS• •TITANIUM ALLOYS (TI-7AL-12ZR)• ALUMINUM ALLOYS• ZIRCONIUM ALLOYS.) (TENSILE PROPERTIES• CREEP• •MICROSTRUCTURE• SURFACE PROPERTIES• CONTAMINATION.) (MELTING• ELECTRIC ARCS• VACUUM FURNACES• FORGE PRESSES• ROLLING MILLS• HEAT TREATMENT• CLEANING.)

AD-273 179 62-2-5 DIV. 26
CHANCE VOUGHT CORP.• DALLAS• TEX.
(ALLOYS• •METALS• •SHEETS• PIPES• CYLINDRICAL BODIES• •PROCESSING• TOOLS• DIES• DESIGN• ANALYSIS.) (DEFORMATION• EXPLOSIVE FORMING• METAL FORMING PRESSES• METAL PLATES• HYDROSTATIC PRESSURE• ELECTROMAGNETISM• HYDRAULIC PRESSES.) •BERYLLIUM• STAINLESS STEEL• TITANIUM ALLOYS• TOOL STEEL• TUNGSTEN• CHROMIUM ALLOYS• ALUMINUM ALLOYS• MOLYBDENUM ALLOYS• NICKEL ALLOYS• COBALT ALLOYS• NIOBIUM ALLOYS• VANADIUM ALLOYS• SOLID STATE PHYSICS• SOLIDS• LIQUIDS• GASES• INDUSTRIAL PRODUCTION• HANDBOOKS.

AD-273 215 62-2-5 DIV. 14
CALIFORNIA U.• BERKELEY.
(•PLATING• •SHEETS• SURFACE TEMPERATURES• •HEAT TRANSFER.) (MATERIALS• HEAT SHIELDS OR SINK• THERMAL CONDUCTIVITY.) (GRAPHITE• TEMPERATURE• MEASUREMENT• PHYSICAL PROPERTIES• HIGH TEMPERATURE RESEARCH.)

•SHELTERS

AD-273 202 62-2-5 DIV. 13
ARMY ENGINEER RESEARCH AND DEVELOPMENT LABS.• FORT BELVOIR• VA.
(•PROTECTIVE COVERINGS• •SHELTERS• PORTABLE SHELTERS• •CONSTRUCTION• STRUCTURE• DESIGN.) (MILITARY ENGINEERING• STRUCTURES MATERIALS• BLAST• RESISTANCE• NUCLEAR EXPLOSIONS• ATOMIC BOMB EXPLOSIONS• NUCLEAR WEAPONS• RADIOLOGICAL CONTAMINATION• RADIATION EFFECTS• EFFECTIVENESS• TESTS.)

•SHIELDING

AD-273 316 62-2-5 DIV. 9
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION• WASHINGTON• D. C.
(•RE-ENTRY VEHICLES• AERODYNAMIC HEATING• RE-ENTRY AERODYNAMICS• AERODYNAMICS• SUPERSONICS• AIRFRAMES• •THERMAL INSULATION •SHIELDING• COUNTERMEASURES• MODEL TESTS• WIND TUNNEL MODELS.)

•SHIP HULLS

AD-273 027 62-2-5 DIV. 31
DAVIDSON LAB.• STEVENS INST. OF TECH.• HOBOKEN• N. J.
(•SHIP HULLS• SHIP MODELS• •MARINE PROPELLERS• •HYDRODYNAMICS.) (THRUST AND TORQUE IN BODIES OF REVOLUTION• DRAG.) (BESSEL FUNCTIONS• POLYNOMIALS• HARMONIC ANALYSIS.)

•SHOCK WAVES

AD-273 205 62-2-5 DIV. 9
BALLISTIC RESEARCH LABS.• ABERDEEN PROVING GROUND• MD.

(•SHOCK WAVES• •BLAST• SPHERES• •TURBULENT FLOW• SPACE CHARGES•) (HYDRODYNAMICS• EQUATIONS• PARTICLES• VELOCITY•) (PIEZOELECTRIC GAGES• MEASUREMENT•) (NUMERICAL ANALYSIS• •INTEGRATION• PARTIAL DIFFERENTIAL EQUATIONS•) DIGITAL COMPUTERS.

AD-273 247 62-2-5 DIV. 25
MATHEMATICS RESEARCH CENTER, U. OF WISCONSIN, MADISON.
(•SHOCK WAVES• FLUID FLOW• •MAGNETOHYDRODYNAMICS• PARTICLES• MAGNETIC FIELDS•) (COMPRESSIBLE FLOW• GAS IONIZATION• •FLUID MECHANICS• ACOUSTICS•) (•PERTURBATION THEORY• PARTIAL DIFFERENTIAL EQUATIONS•)

•SIGNAL GENERATORS

AD-273 144 62-2-5 DIV. 30
PANORAMIC RADIO PRODUCTS, INC., MOUNT VERNON, N. Y.
(•RADIOFREQUENCY SPECTRUM ANALYZERS• HIGH FREQUENCY• •SIGNAL GENERATORS• AUDIOFREQUENCY• •TEST SETS• DESIGN•) (SIDEBANDS• RADIO TRANSMITTERS• TEST EQUIPMENT• TRANSISTORS• •NAVAL EQUIPMENT• SPECIFICATIONS•)

•SIGNALS

AD-273 443 62-2-5 DIV. 30
SYLVANIA ELECTRIC PRODUCTS, INC., •WALTHAM• MASS.
(•RESEARCH PROGRAM ADMINISTRATION• THEORY AND TEST METHODS OF MATHEMATICAL ANALYSIS• •MAPPING OF •SPEECH TRANSMISSION• •SIGNALS•) (ANALYSIS• SYNTHESIS OF DATA• SAMPLING•) (TIME FUNCTIONS• SERIES• FOURIER ANALYSIS•) (PROGRAMMING• DIGITAL COMPUTERS• COMMUNICATIONS THEORY•)

•SILICON

AD-273 130 62-2-5 DIV. 6
INTERNATIONAL RECTIFIER CORP., LOS ANGELES, CALIF.
(•RECTIFIERS• •SILICON• •DIODES• ELECTRON TUBES• SEMICONDUCTORS• THERMODYNAMICS• TESTS• TEST METHODS• CIRCUIT TESTERS• RELIABILITY•)
DESIGN• PRODUCTION• •MANUFACTURING METHODS•

AD-273 138 62-2-5 DIV. 8
MOTOROLA, INC., PHOENIX, ARIZ.
(•TRANSISTORS• •DIELECTRICS• •GERMANIUM• •SILICON• •SEMICONDUCTORS• •SURFACES• SURFACE PROPERTIES• DIELECTRIC PROPERTIES•) (PROCESSING• AGING• ENCAPSULATION• CONTROLLED ATMOSPHERES• CONTROL OF RATE• VAPOR WITH BARIUM COMPOUNDS• OXIDES• NITROGEN• OXYGEN• HYDROGEN COMPOUNDS• BORON COMPOUNDS• DIODES•) IRRADIATION• SILICON• SILICON COMPOUNDS• DIOXIDES• TEMPERATURE•)

AD-273 172 62-2-5 DIV. 8
DAVISON CHEMICAL CO., BALTIMORE, MD.
(PRODUCTION• MANUFACTURING METHODS• •RESISTORS• •THERMISTORS• •SEMICONDUCTORS OF SINGLE CRYSTALS OF •SILICON •WITH CHEMICAL IMPURITIES• •GOLD• DIFFUSING• ALUMINUM• ELECTRODES•) ZONE MELTING.

•SILICONES

AD-273 290 62-2-5 DIV. 14
BONDEN CO., PHILADELPHIA, PA.
(•ELASTOMERS• SYNTHETIC RUBBER, •SILICONES• •REINFORCING MATERIALS• HIGH TEMPERATURE RESEARCH•) (SILICONES• CHEMICAL REACTIONS• HYDROLYSIS• PHENYL RADICALS• CHLORIDES• SILANES OR CYANATES OR TITANIUM COMPOUNDS•) (MECHANICAL PROPERTIES• TENSILE PROPERTIES• ELASTICITY• VISCOSITY• HARDNESS• TEMPERATURE• STABILITY•)

•SILVER ALLOYS

AD-273 287 62-2-5 DIV. 17
ARMOUR RESEARCH FOUNDATION, CHICAGO, ILL.
(BRITTLE MATERIALS• •BERYLLIUM ALLOYS• •ALUMINUM ALLOYS• •SILVER ALLOYS• GERMANIUM ALLOYS• PREPARATION• SINTERING•) (POWDER ALLOYS• POWDER METALS• POWDER METALLURGY• BONDING• BINDERS• PROCESSING•) (HEAT TREATMENT• MECHANICAL PROPERTIES•)

•SIMULATION

AD-273 154 62-2-5 DIV. 20
STANFORD RESEARCH INST., MENLO PARK, CALIF.
(•FEASIBILITY STUDIES ON •SIMULATION OF •GROUND EFFECT• MOTION FROM SURFACES OR UNDERGROUND EXPLOSIONS• •NUCLEAR EXPLOSIONS USING NON NUCLEAR EXPLOSIVES•) (GASES• DETONATION• SHOCK WAVES•)

•SINGLE CRYSTALS

AD-273 227 62-2-5 DIV. 17
INDIANA STEEL PRODUCTS CO., VALPARAISO.
(MAGNETS• •MAGNETIC MATERIALS• •SINGLE CRYSTALS• •LATTICES• ALLOYS• IRON ALLOYS• NICKEL ALLOYS• COBALT ALLOYS• ALUMINUM ALLOYS• PROCESSING•) PRECIPITATION• PHASE STUDIES• CASTING• HEAT TREATMENT•) (TEST METHODS• ELECTRON MICROSCOPY• ELECTRON DIFFRACTION ANALYSIS•)

AD-273 254 62-2-5 DIV. 20
NAVAL RESEARCH LAB., WASHINGTON, D. C.
(RESEARCH REACTORS• •NEUTRON DIFFRACTION ANALYSIS OF •SINGLE CRYSTALS AND CRYSTAL STRUCTURE• MAGNETIC PROPERTIES•) (AUTOMATION• DIGITAL COMPUTERS• PROGRAMING) (•NEUTRON BEAMS• MONOCHROMATIC LIGHT• DIFFRACTION GRATINGS• OPTICAL EQUIPMENT•)

AD-273 425 62-2-5 DIV. 14
MATERIALS RESEARCH LAB., U. OF CALIF., BERKELEY.
(•LITHIUM COMPOUNDS• •FLUORIDES, IONS• •CRYSTALS• •SINGLE CRYSTALS• CRYSTAL STRUCTURE• LATTICES•) (TESTS• MECHANICAL PROPERTIES• DEFORMATION• PLASTICITY• FRACTURE (MECHANICS)• RUPTURE• FAILURE (MECHANICS)• TENSILE PROPERTIES• BRITTLE MATERIALS•) GROWTH•

•SODIUM COMPOUNDS

AD-273 222 62-2-5 DIV. 14
GENERAL DYNAMICS/ASTRONAUTICS, SAN DIEGO, CALIF.
(•CERAMIC MATERIALS• •BRITTLE MATERIALS• SOLIDS• SINGLE CRYSTALS• •DEFORMATION• •PLASTICITY• MECHANICAL PROPERTIES• PHYSICAL PROPERTIES•) (TEST METHODS• TEST EQUIPMENT•) (•SODIUM COMPOUNDS• CHLORITES• •MAGNESIUM COMPOUNDS• OXIDES• DATA•) SOLID STATE PHYSICS.

•SOILS

AD-273 229 62-2-5 DIV. 13
IOAA STATE U. OF SCIENCE AND TECH., AMES.
(•UNDERGROUND STRUCTURES• •SOILS• •EARTH MODELS• BLAST• LOAD DISTRIBUTION• PRESSURE• STRESSES• SIMULATION• IMPACT SHOCK, MATHEMATICAL ANALYSIS• MODEL TESTS•)

•SOLAR CELLS

AD-273 336 62-2-5 DIV. 8
•WESTINGHOUSE ELECTRIC CORP., BALTIMORE, MD.
(•PHOTOTUBES• •SOLAR CELLS• SOLAR ENERGY• •POWER TRANSFORMERS• •GENERATORS DESIGN• PRODUCTION• MANUFACTURING METHODS•) (ELECTRON TUBES• CATHODES (ELECTRON TUBES)• PHOTOSENSITIVITY• PHOTOEMISSION• ANODES (ELECTRON TUBES)• GLASS• INSULATING MATERIALS• VACUUM SEALS• PROCESSING• CLEANING• TEST METHODS•)

•SOLAR SPECTRUM

AD-273 032 62-2-5 DIV. 25
VITRO LABS., WEST ORANGE, N. J.
(•SOLAR SPECTRUM• SIMULATION• PLASMA PHYSICS• •ELECTRIC ARCS•) (ELECTRIC ARCS• GASES• ARGON•) •BLACKBODY RADIATION.

•SOLID ROCKET PROPELLANTS

AD-273 012 62-2-5 DIV. 10
ROHM AND HAAS CO., HUNTSVILLE, ALA.
(•PROPELLANT GRAINS• •SOLID ROCKET PROPELLANTS• DESIGN• CONFIGURATION•)
(•MATHEMATICAL ANALYSIS• PROGRAMMING• •TABLES• SURFACES•)

•SOLID STATE PHYSICS

AD-273 145 62-2-5 DIV. 25
RESEARCH LAB. OF ELECTRONICS, MASS. INST. OF TECH., CAMBRIDGE.
(•SOLID STATE PHYSICS• ELECTRON BEAMS• •THIN FILMS• •MAGNETO-OPTIC ROTATION• COBALT• DIELECTRICS• FERROMAGNETIC MATERIAL• MAGNETIC EFFECTS• PERTURBATION THEORY•) (MOLECULAR STRUCTURE• FEEDBACK•) (LATTICES• CRYSTAL STRUCTURE• INTERMETALLIC COMPOUNDS• TIN COMPOUNDS• COPPER COMPOUNDS• IRON COMPOUNDS• ALGEBRA•) (COMPUTERS• •DIGITAL COMPUTERS•) COMPUTER SYSTEMS THEORY.

•SOLIDS

AD-273 118 62-2-5 DIV. 25
ALLIED RESEARCH ASSOCIATES, INC., BOSTON, MASS.
(•HEAT TRANSFER• •SOLIDS• SHEETS• •THERMAL CONDUCTIVITY•) (INTEGRAL EQUATIONS• DIFFERENTIAL EQUATIONS• NUMERICAL ANALYSIS•)

•SOUND TRANSMISSION

AD-273 261 62-2-5 DIV. 31
DEFENSE RESEARCH LAB., U. OF TEXAS, AUSTIN.
(TESTS ON RANGES FOR DETERMINATION OF EFFECTIVENESS OF •ACOUSTIC FILTERS FOR ATTENUATION• REDUCTION OF •SUBMARINE •NOISE CAUSED BY LIQUIDS IN PIPES•) •SOUND TRANSMISSION• ACOUSTICS• INSTRUMENTATION• ACCELEROMETERS• VIBRATION ISOLATORS.

•SPACE ENVIRONMENTAL CONDITIONS

AD-273 175 62-2-5 DIV. 24
PIONEER-CENTRAL DIV., •BENDIX CORP., DAVENPORT, IOWA.
(•OXYGEN EQUIPMENT FOR •WEIGHTLESSNESS IN •SPACE ENVIRONMENTAL CONDITIONS•) (PRESSURE BREATHING• LIQUEFIED GASES• OXYGEN•) DESIGN.

AD-273 256 62-2-5 DIV. 30
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION• WASHINGTON, D. C.
(SPACE ENVIRONMENTAL CONDITIONS• •ULTRAVIOLET RADIATION• MEASUREMENT OF •IONIZATION CHAMBERS• MANUFACTURING METHODS• DESIGN• CALIBRATION• VACUUM APPARATUS•) (SATELLITE VEHICLES• SPACE PROBES• INSTRUMENTATION•) (MATERIALS• CERAMIC MATERIALS•)

•SPACE FLIGHT

AD-273 329 62-2-5 DIV. 12
RAND CORP., SANTA MONICA, CALIF.
(•SPACE FLIGHT• DYNAMICS• •ORBITAL FLIGHT PATHS• DIGITAL COMPUTERS• MATHEMATICAL ANALYSIS• DIFFERENTIAL EQUATIONS• INTEGRAL EQUATIONS• PARTIAL DIFFERENTIAL EQUATIONS•) (EQUATIONS OF MOTION• OPERATIONS RESEARCH•)

•SPACE MEDICINE

AD-273 098 62-2-5 DIV. 10
AEROSPACE MEDICAL LAB., AERONAUTICAL SYSTEMS DIV., •WRIGHT-PATTERSON AIR FORCE BASE, OHIO.
(•WEIGHTLESSNESS• •SPACE MEDICINE• MAN•) (TEST METHODS• AIRBORNE• FLIGHT TESTING• WATER SIMULATION• ROTATION•) (BEHAVIOR• STRESS (PSYCHOLOGY)• SENSORY PERCEPTION• REACTION (PSYCHOLOGY)•) (STRESS (PHYSIOLOGY)• HEART• EAR• MOTION SICKNESS• MOTOR REACTIONS•)

•SPACE NAVIGATION

AD-273 085 62-2-5 DIV. 12
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION WASHINGTON, D. C.
(•SPACESHIPS• MANNED• •SPACE NAVIGATION• SPACE FLIGHT• GUIDANCE• AIRBORNE• NAVIGATION COMPUTERS• LINEAR SYSTEMS• •OPTICAL SYSTEMS• POSITION FINDING• VELOCITY• FLIGHT PATHS• MATHEMATICAL PREDICTION•) (CELESTIAL MECHANICS• PERTURBATION THEORY• STATISTICAL ANALYSIS• ERRORS• PROBABILITY•) (MOON• ORBITAL FLIGHT PATHS• CONTROL SYSTEMS•)

AD-273 310 62-2-5 DIV. 2
GEOPHYSICS CORP. OF AMERICA• BEDFORD, MASS.
(•MOON• SURFACE PROPERTIES• BRIGHTNESS• LIGHT• NAVIGATION• •SPACE NAVIGATION•) (MEASUREMENT OF BRIGHTNESS OF MOON •WITH PHOTOMETERS•) ASTRONOMY.

•SPACESHIPS

AD-273 095 62-2-5 DIV. 12
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION WASHINGTON, D. C.
(•SPACESHIPS• MANNED• •SPACE NAVIGATION• SPACE FLIGHT• GUIDANCE• AIRBORNE• NAVIGATION COMPUTERS• LINEAR SYSTEMS• •OPTICAL SYSTEMS• POSITION FINDING• VELOCITY• FLIGHT PATHS• MATHEMATICAL PREDICTION•) (CELESTIAL MECHANICS• PERTURBATION THEORY• STATISTICAL ANALYSIS• ERRORS• PROBABILITY•) (MOON• ORBITAL FLIGHT PATHS• CONTROL SYSTEMS•)

AD-273 273 62-2-5 DIV. 5
PHILCO CORP., BLUE BELL, PA.
(•LIGHT COMMUNICATION SYSTEMS •OPTICAL TRACKING• COMMUNICATION SYSTEMS• TRACKING• •SATELLITE VEHICLES• •LUNAR PROBE• •SPACESHIPS• COMMUNICATIONS THEORY•) (SATELLITE ATTITUDE• GYROSCOPES• ORBITAL FLIGHT PATHS•) (SATELLITE ATTITUDE• STABILIZATION) (TRACKING •IN THIN FILMS• DETECTORS•) (SATELLITE VEHICLES• ATTITUDES• CONFIGURATION•) SIGNAL-TO-•NOISE RATIO• PHOTOMULTIPLIERS.

•SPARKS

AD-273 240 62-2-5 DIV. 8
MOTOROLA, INC., RIVERSIDE, CALIF.
(LIGHT PULSES• •SPARKS• •ELECTRIC ARCS• •MINERAL OILS• DESIGN• ILLUMINATING•)

•SPECIFICATIONS

AD-273 151 62-2-5 DIV. 12
•GUIDED MISSILES• SHIPPING• •CONTAINERS•)
REED RESEARCH INC., •WASHINGTON, D. C.
(DESIGN• STANDARDIZATION FOR (PREPARATION OF •STANDARDS AND •SPECIFICATIONS FOR GUIDED MISSILES• CONTAINERS•) (CONTAINERS• TEST METHODS• TEST EQUIPMENT• TESTS• MILITARY REQUIREMENTS•) (SPECIFICATIONS FOR CORROSION, HANDLING• VIBRATION• SHOCK RESISTANCE• TEST•)

•SPECTROGRAPHIC ANALYSIS

AD-273 171 62-2-5 DIV. 6
GENERAL ELECTRIC CO., SUNNYVALE, CALIF.
(•THIN FILMS; •ELECTRON TUBES; ANALYSIS,) (FILMS; •SPECTROGRAPHIC ANALYSIS; OPTICAL ANALYSIS; X-RAY SPECTROSCOPY; MASS SPECTROSCOPY; THEORY,) (DIODES; TRIODES; TESTS; LIFE EXPECTANCY,)

•SPEECH TRANSMISSION

AD-273 443 62-2-5 DIV. 30
SYLVANIA ELECTRIC PRODUCTS, INC., WALTHAM, MASS.
(•RESEARCH PROGRAM ADMINISTRATION; THEORY AND TEST METHODS OF MATHEMATICAL ANALYSIS; •MAPPING OF •SPEECH TRANSMISSION; •SIGNALS,) (ANALYSIS; SYNTHESIS OF DATA; SAMPLING,) (TIME; FUNCTIONS; SERIES; FOURIER ANALYSIS,) (PROGRAMMING; DIGITAL COMPUTERS; COMMUNICATIONS THEORY,)

•SPHERES

AD-273 006 62-2-5 DIV. 6
RADIATION LAB., U. OF MICHIGAN, ANN ARBOR, MICH.
(MATHEMATICAL ANALYSIS OF •RADAR ECHO AREAS FROM •SPHERES,) (DIFFRACTION; SCATTERING OF ELECTROMAGNETIC WAVES FROM SPHERES,) (TRANSFORMATIONS (MATHEMATICS); BESSEL FUNCTIONS; FUNCTIONS,

AD-273 054 62-2-5 DIV. 25
MICROWAVE RESEARCH INST., POLYTECHNIC INST. OF BROOKLYN, N. Y.
(•ELECTROMAGNETIC FIELDS; •PROPAGATION; ANALYSIS; •SYNTHESIS; •WAVEGUIDES,) (•SPHERES; •CYLINDRICAL BODIES; •GREEN'S FUNCTION; VECTOR ANALYSIS,) (•PHYSICS; PARTIAL DIFFERENTIAL EQUATIONS,) (COMPLEX VARIABLES; FUNCTIONS; TRANSFORMATIONS (MATHEMATICS); BESSEL FUNCTIONS; INTEGRAL EQUATIONS,)

AD-273 069 62-2-5 DIV. 5
GENERAL MILLS, INC., MINNEAPOLIS, MINN.
(•SATELLITE VEHICLES FOR •COMMUNICATION SYSTEMS; •RADIO COMMUNICATION SYSTEMS,) (REFLECTION; SCATTERING OF MICROWAVES; RADIO WAVES FROM SATELLITE VEHICLES; •SPHERES; METALS,) (EFFECT OF GRAVITY; MAGNETIC FIELDS; ELECTROMAGNETIC FIELDS ON SATELLITE VEHICLES,) (DEFORMATION OF STRUCTURAL SHELLS FROM THERMAL STRESSES,) (FEASIBILITY STUDIES OF MATERIALS FOR SURFACES OF SATELLITE VEHICLES,) FEASIBILITY STUDIES OF CONFIGURATION FOR SATELLITE VEHICLES.

AD-273 412 62-2-5 DIV. 20
FOREIGN TECH. DIV., AIR FORCE SYSTEMS COMMAND, WRIGHT-PATTERSON AIR FORCE BASE, OHIO.
(•POWER REACTORS; •SPHERES; PARTICLES; VELOCITY; DIFFUSION; SCATTERING; REFLECTION,) (HETEROGENEOUS REACTORS; •BOILING WATER REACTORS; •NUCLEAR POWER PLANTS; •KINETIC THEORY,) (GRAPHITE; BERYLLIUM; PLUTONIUM COMPOUNDS; STATISTICAL DISTRIBUTIONS; STATISTICAL FUNCTIONS; POLYNOMIALS; FUNCTIONS; INTEGRAL EQUATIONS; NUMERICAL METHODS AND PROCEDURES; TABLES,)

•STAINLESS STEEL

AD-273 065 62-2-5 DIV. 14
GENERAL DYNAMICS/ASTRONAUTICS, SAN DIEGO, CALIF.
(•ALLOYS; •METALS; •PLASTICS; EXPANDED PLASTICS; •GLASS TEXTILES; LAMINATES; SHEETS; METAL PLATES; TITANIUM; •TITANIUM ALLOYS; •ALUMINUM ALLOYS; •STAINLESS STEEL; •STEEL; •NICKEL ALLOYS,) (LOW TEMPERATURE RESEARCH; CRYOGENICS; MECHANICAL PROPERTIES; PHYSICAL PROPERTIES; FATIGUE (MECHANICS); CORROSION,) (MARTENSITE; X-RAY DIFFRACTION ANALYSIS,) (THERMAL EXPANSION; •EASUREMENT)

AD-273 220 62-2-5 DIV. 17
GENERAL DYNAMICS/ASTRONAUTICS, SAN DIEGO, CALIF.
(•ELASTICITY; MEASUREMENT OF •STAINLESS STEEL AT ULTRASONICS AT CRYOGENICS TEMPERATURE,) (METALS; SOUND TRANSMISSION; VELOCITY; COPPER,) LOW TEMPERATURE RESEARCH; SOLID STATE PHYSICS; TEST EQUIPMENT; INSTRUMENTATION; ALLOYS.

AD-273 221 62-2-5 DIV. 17
GENERAL DYNAMICS/ASTRONAUTICS, SAN DIEGO, CALIF.
(•STAINLESS STEEL (300 SERIES); •PHASE TRANSITIONS; •AUSTENITE; DECOMPOSITION; MARTENSITE; MEASUREMENT; CRYOGENICS; TEMPERATURE; DEFORMATION; MECHANICAL PROPERTIES; MAGNETIC PROPERTIES,) (TEST METHODS; TEST EQUIPMENT; FERROMAGNETISM,) LOW TEMPERATURE RESEARCH; SOLID STATE PHYSICS; ALLOYS.

AD-273 223 62-2-5 DIV. 17
GENERAL DYNAMICS/ASTRONAUTICS, SAN DIEGO, CALIF.
(•RADIATION EFFECTS OF NUCLEAR ENERGY ON ALLOYS; •STAINLESS STEEL (301) (310); •TITANIUM ALLOYS (A110AT); •ALUMINUM ALLOYS (2014-T6); CRYOGENICS; LIQUEFIED GASES; HYDROGEN,) (TESTS; MECHANICAL PROPERTIES; TENSILE PROPERTIES; ELASTICITY; DEFORMATION,)

•STANDARDS

AD-273 151 62-2-5 DIV. 14
REED RESEARCH INC., WASHINGTON, D. C.
(DESIGN; STANDARDIZATION FOR •GUIDED MISSILES; SHIPPING; •CONTAINERS,) (PREPARATION OF •STANDARDS AND •SPECIFICATIONS FOR GUIDED MISSILES; CONTAINERS,) (CONTAINERS; TEST METHODS; TEST EQUIPMENT; TESTS; MILITARY REQUIREMENTS,) (SPECIFICATIONS FOR CORROSION, HANDLING; VIBRATION; SHOCK RESISTANCE; TEST,)

•STARS

AD-273 154 62-2-5 DIV. 2
NORTHWESTERN U., EVANSTON, ILL.
(•STARS; •MOTION; MEASUREMENT RECORDING DEVICES,)

•STATISTICAL ANALYSIS

AD-273 235 62-2-5 DIV. 30
LITTON SYSTEMS, INC., WALTHAM, MASS.
(•PROGRAMMING; PATTERN RECOGNITION; •SAMPLING; •DATA PROCESSING SYSTEMS; AUTOMATIC DECISION THEORY; •STATISTICAL ANALYSIS,) (DIGITAL COMPUTERS; TESTS; SIGNAL-TO-NOISE RATIO,) (INTEGRAL EQUATIONS; MATRIX ALGEBRA; TIME; •TRANSFORMATIONS (MATHEMATICS); SEQUENCES; TAYLOR'S SERIES; STATISTICAL DISTRIBUTIONS; PROBABILITY; INEQUALITIES,)

AD-273 241 62-2-5 DIV. 30
MELPAR, INC., WATERTOWN, MASS.
(•STATISTICAL ANALYSIS; THEORY AS APPLIED TO DECISION THEORY; •GUIDED MISSILES; •IDENTIFICATION AND DISCRIMINATORS (DETECT),) (DIGITAL COMPUTERS; CODING; SIGNAL-TO-NOISE RATIO; COMMUNICATIONS THEORY; DIGITAL CONVERTERS; NUMERICAL METHODS AND PROCEDURES; MATRIX ALGEBRA; PROBABILITY; INTEGRAL EQUATIONS; TRANSFORMATIONS (MATHEMATICS),)

•STATISTICAL FUNCTIONS

AD-273 243 62-2-5 DIV. 8
LINCOLN LAB., MASS. INST. OF TECH., LEXINGTON.
(•COMMUNICATIONS THEORY; •STATISTICAL PROCESSES; •STATISTICAL FUNCTIONS; MATHEMATICAL ANALYSIS; TRANSFORMATIONS (MATHEMATICS); •FOURIER ANALYSIS; •SERIES,) (•RADIOMETERS; CALIBRATION; CIRCUITS; SIGNAL-TO-NOISE RATIO,)

AD-273 433 62-2-5 DIV. 2
AMERICAN METEOROLOGICAL SOCIETY, BOSTON, MASS.
(•IONOSPHERIC DISTURBANCES; •ELECTROMAGNETIC FIELDS; REFLECTION; •DRIFT; •IND.,) (STATISTICAL PROCESSES; •STATISTICAL FUNCTIONS,) USSR.

•STATISTICAL PROCESSES

AD-273 243 62-2-5 DIV. 8
LINCOLN LAB., MASS. INST. OF TECH., LEXINGTON.
(•COMMUNICATIONS THEORY; •STATISTICAL PROCESSES; •STATISTICAL FUNCTIONS; MATHEMATICAL ANALYSIS; TRANSFORMATIONS (MATHEMATICS); •FOURIER ANALYSIS; •SERIES,) (•RADIOMETERS; CALIBRATION; CIRCUITS; SIGNAL-TO-NOISE RATIO,)

•STEEL

AD-273 004 62-2-5 DIV. 17
MANUFACTURING LABS., INC., CAMBRIDGE, MASS.
(•PROCESSING; HEAT TREATMENT AND DEFORMATION; HARDENING; AGING ON •STEEL (H11); MECHANICAL PROPERTIES; TENSILE PROPERTIES,) (AUSTENITE; DETERMINATION BY X-RAY DIFFRACTION ANALYSIS,) (MICROSTRUCTURE BY ELECTRON MICROSCOPY,) (FRACTURE (MECHANICS); IMPACT SHOCK; TEST METHODS,)

AD-273 052 62-2-5 DIV. 20
•ESTERN GEAR CORP., LYNWOOD, CALIF.
(•FORGING; ALLOYS; •HEAT RESISTANT ALLOYS; •REFRACTORY MATERIALS; •STEEL; STAINLESS STEEL; •TOOL STEEL; •TITANIUM ALLOYS,) (TEMPERATURE; PRESSURE; DEFORMATION; HEAT TREATMENT,) (MICROSTRUCTURE; TENSILE PROPERTIES; MECHANICAL PROPERTIES,) INDUSTRIAL EQUIPMENT.

AD-273 065 62-2-5 DIV. 14
GENERAL DYNAMICS/ASTRONAUTICS, SAN DIEGO, CALIF.
(•ALLOYS; •METALS; •PLASTICS; EXPANDED PLASTICS; •GLASS TEXTILES; LAMINATES; SHEETS; METAL PLATES; TITANIUM; •TITANIUM ALLOYS; •ALUMINUM ALLOYS; •STAINLESS STEEL; •STEEL; •NICKEL ALLOYS,) (LOW TEMPERATURE RESEARCH; CRYOGENICS; MECHANICAL PROPERTIES; PHYSICAL PROPERTIES; FATIGUE (MECHANICS); CORROSION,) (MARTENSITE; X-RAY DIFFRACTION ANALYSIS,) (THERMAL EXPANSION; MEASUREMENT)

AD-273 093 62-2-5 DIV. 27
AEROJET-GENERAL CORP., SACRAMENTO, CALIF.
(GUIDED MISSILES; SURFACE TO SURFACE; ROCKET MOTORS,) (•ROCKET CASES; •STEEL (D-6AC); STRUCTURES; STRESSES; ANALYSIS; MEASUREMENT; ELLIPSOIDS; CYLINDRICAL BODIES; DEFLECTION; DEFORMATION; HYDROSTATIC PRESSURE; TENSILE PROPERTIES; FAILURE (MECHANICS); DESIGN,) (TEST EQUIPMENT; STRAIN GAGES,)

AD-273 297 62-2-5 DIV. 27
DEFENSE METALS INFORMATION CENTER, COLUMBUS, OHIO.
(•ROCKET CASES; MATERIALS; •STEEL; •TITANIUM ALLOYS; LAMINATES; FILAMENT WOUND CONSTRUCTION; GLASS TEXTILES; PLASTICS; EFFECTIVENESS; DESIGN,) (STRESSES; DEFORMATION; MECHANICAL PROPERTIES; PHYSICAL PROPERTIES; BUCKLING; ELASTICITY; DENSITY,)

AD-273 418 62-2-5 DIV. 20
GENERAL DYNAMICS/FORT WORTH, TEX.
(•RADIATION EFFECTS; X-RAYS; GAMMA RAYS; ALPHA PARTICLES; NEUTRONS; BETA PARTICLES; MATERIALS; METALS; SEMICONDUCTORS; OPTICAL MATERIALS; GLASS; PLASTICS; ELASTOMERS; ORGANIC MATERIALS; INORGANIC SUBSTANCES; ELECTRICAL EQUIPMENT; ELECTRONIC EQUIPMENT; ELECTRIC INSULATION,) (NUCLEAR REACTIONS; •STEEL; •ALUMINUM ALLOYS; •COPPER ALLOYS; •NICKEL ALLOYS; ALLOYS,) (RADIOBIOLOGY; •RADIATION HAZARDS; DOSAGE,) (AIRCRAFT; NUCLEAR PROPULSION,)

•STRAIN GAGES

AD-273 322 62-2-5 DIV. 30
ARMOUR RESEARCH FOUNDATION, CHICAGO, ILL.
(•STRAIN GAGES; MATERIALS; •IRE; IRON ALLOYS; CHROMIUM ALLOYS; ALUMINUM ALLOYS; DRAWING (MACHINE PROCESSING),) (THERMAL STRESSES; MEASUREMENT; AIRFRAMES; AIRCRAFT; STRUCTURES; AERODYNAMIC HEATING,) HIGH TEMPERATURE RESEARCH; CALIBRATION; THERMAL EXPANSION; RESISTANCE; ELECTRICAL CONDUCTANCE.

•STRESSES

AD-273 137 62-2-5 DIV. 14
AEROELASTIC AND STRUCTURES RESEARCH LAB., MASS. INST. OF TECH., CAMBRIDGE.
(SHEETS; METAL PLATES; •GLASS TEXTILES; LAMINATES; •SANDWICH PANELS; •ALUMINUM ALLOYS; FOILS; •STRESSES; LOADING; •FAILURE (MECHANICS); THEORY; MATHEMATICAL ANALYSIS; PROGRAMMING,) (NAMES; STRUCTURES,) (TEST METHODS; HIGH PRESSURE RESEARCH; HYDROSTATIC PRESSURE; SHOCK WAVES; TEST EQUIPMENT; SHOCK TUBES,)

•STRONTIUM

AD-273 076 62-2-5 DIV. 4
MASSACHUSETTS INST. OF TECH., CAMBRIDGE.
(METEORITES; •MINERALS; •GEOCHEMISTRY; •ISOTOPES; RADIOACTIVE ISOTOPES; •STRONTIUM; •RUBIDIUM; AUSTRALIA; INDOCHINA INDONESIA; PHILIPPINE ISLANDS; NORTH AMERICA; CZECHOSLOVAKIA,) CHEMICAL ANALYSIS; MASS SPECTROSCOPY; X-RAY SPECTROSCOPY; FLUORESCENCE.

•STRUCTURAL SHELLS

AD-273 306 62-2-5 DIV. 13
LOCKHEED AIRCRAFT CORP., SUNNYVALE, CALIF.
(•STRUCTURES; MEMBRANES; •PRESSURE VESSELS,) (MEMBRANES; FILAMENTS,) (LOAD DISTRIBUTION; •STRUCTURAL SHELLS; TENSILE PROPERTIES; MATHEMATICAL ANALYSIS,) STRESSES.

•STRUCTURES

AD-273 306 62-2-5 DIV. 13
LOCKHEED AIRCRAFT CORP., SUNNYVALE, CALIF.
(•STRUCTURES; MEMBRANES; •PRESSURE VESSELS,) (MEMBRANES; FILAMENTS,) (LOAD DISTRIBUTION; •STRUCTURAL SHELLS; TENSILE PROPERTIES; MATHEMATICAL ANALYSIS,) STRESSES.

•SUBMARINE NOISE

AD-273 261 62-2-5 DIV. 31
DEFENSE RESEARCH LAB., U. OF TEXAS, AUSTIN.
(TESTS ON RANGES FOR DETERMINATION OF EFFECTIVENESS OF •ACOUSTIC FILTERS FOR ATTENUATION; REDUCTION OF •SUBMARINE NOISE CAUSED BY LIQUIDS IN PIPES,) •SOUND TRANSMISSION; ACOUSTICS; INSTRUMENTATION; ACCELEROMETERS; VIBRATION ISOLATORS.

•SULFUR COMPOUNDS

AD-273 049 62-2-5 DIV. 4
AEROSPACE CORP., LOS ANGELES, CALIF.
(•FLUORIDES OR •OXYFLUORITES OF •SULFUR COMPOUNDS; •SELENIUM COMPOUNDS; •TELLURIUM COMPOUNDS; SYNTHESIS; CHEMICAL REACTIONS; PHYSICAL PROPERTIES; THERMODYNAMICS; HEAT OF FORMATION,)

•SUPERSONIC DIFFUSERS

AD-273 299 62-2-5 DIV. 9
ARNOLD ENGINEERING DEVELOPMENT CENTER, ARNOLD AIR FORCE STATION, TENN.
(•SUPERSONIC DIFFUSERS, •SUPERSONIC WIND TUNNELS, ROCKETS, •EXHAUST GASES, TESTS, THEORY.) (NITRIC ACID, METHYL HYDRAZINES.) MACH NUMBER.

•SUPERSONIC WIND TUNNELS

AD-273 299 62-2-5 DIV. 9
ARNOLD ENGINEERING DEVELOPMENT CENTER, ARNOLD AIR FORCE STATION, TENN.
(•SUPERSONIC DIFFUSERS, •SUPERSONIC WIND TUNNELS, ROCKETS, •EXHAUST GASES, TESTS, THEORY.) (NITRIC ACID, METHYL HYDRAZINES.) MACH NUMBER.

•SWEAT COOLING

AD-273 333 62-2-5 DIV. 27
UNITED NUCLEAR CORP., •WHITE PLAINS, N. Y.
(•ROCKET MOTOR NOZZLES, SOLID ROCKET PROPELLANTS, COOLING, •SWEAT COOLING AND FILM COOLING WITH GASES AND LIQUIDS, DESIGN, TESTS, MATHEMATICAL ANALYSIS, MANUFACTURING METHODS.) (COOLANTS, PHYSICAL PROPERTIES, HANDLING, STORAGE.) (MATERIALS, METALS, REFRACTORY MATERIALS, PHYSICAL PROPERTIES.) (TURBULENT BOUNDARY LAYER, HEAT TRANSFER, MATHEMATICAL ANALYSIS, TESTS.)

•SWITCHING CIRCUITS

AD-273 416 62-2-5 DIV. 8
ELECTRICAL ENGINEERING RESEARCH LAB., U. OF ILLINOIS, URBANA.
(ELECTRICAL NETWORKS, SYNTHESIS, •SWITCHING CIRCUITS, •PROGRAMMING, •TRANSISTORS, DIODES, FEEDBACK, LINEAR SYSTEMS.) (•POLYNOMIALS, LEAST SQUARES METHOD, SERIES PROBABILITY, TABLES, EXPERIMENTAL DATA.)

•SYMPOSIA

AD-273 319 62-2-5 DIV. 22
FRANKFORD ARSENAL, PHILADELPHIA, PA.
(•EXPLOSIVE ACTUATORS, •SYMPOSIA.) (EXPLOSIVE ACTUATORS RELATED TO EJECTION SEATS, JETTISONABLE COCKPITS, CATAPULTS, SPACE CAPSULES, GAS GENERATING SYSTEMS, PRIMERS, CONTROL SYSTEMS, PROPELLANTS, HIGH TEMPERATURE RESEARCH, AGING, DETERIORATION, RELIABILITY, EJECTION.) (PROPELLANTS, QUALITY CONTROL, PRODUCTION.) (BOMBS, PARACHUTES.) (ELECTRONIC RELAYS, TIME DELAY RELAYS, TIMING CIRCUITS.) (EXPLODING CABLES, ELECTRIC DETONATORS.)

•SYNCHROS

AD-273 286 62-2-5 DIV. 7
ARINC RESEARCH CORP., •WASHINGTON, D. C.
(•ELECTRICAL EQUIPMENT, MILITARY EQUIPMENT, •RELIABILITY, MATHEMATICAL PREDICTION.) (•ELECTRIC MOTORS, ALTERNATING CURRENT, DIRECT CURRENT, SYNCHRO RECEIVERS, •MOTOR GENERATORS, •SERVO MOTORS, •SYNCHROS, •FAILURE (MECHANICS), AIRBORNE, SHIPBORNE, BEARINGS, LUBRICATION, BRUSHES, ANALYSIS.)

•SYNTHESIS

AD-273 054 62-2-5 DIV. 25
MICROWAVE RESEARCH INST., POLYTECHNIC INST. OF BROOKLYN, N. Y.
(•ELECTROMAGNETIC FIELDS, •PROPAGATION, ANALYSIS, •SYNTHESIS, •WAVEGUIDES.) (•SPHERES, •CYLINDRICAL BODIES, •GREEN'S FUNCTION, VECTOR ANALYSIS.) (•PHYSICS, PARTIAL DIFFERENTIAL EQUATIONS.) (COMPLEX VARIABLES, FUNCTIONS, TRANSFORMATIONS (MATHEMATICS), BESSEL FUNCTIONS, INTEGRAL EQUATIONS.)

•TABLES

AD-273 012 62-2-5 DIV. 10
ROHM AND HAAS CO., HUNTSVILLE, ALA.
(•PROPELLANT GRAINS, •SOLID ROCKET PROPELLANTS, DESIGN, CONFIGURATION.) (MATHEMATICAL ANALYSIS, PROGRAMMING, •TABLES, SURFACES.)

•TANTALUM

AD-273 213 62-2-5 DIV. 17
CENTRAL INST. FOR INDUSTRIAL RESEARCH (NOR•AY). (PHASE STUDIES, METALLIC COMPOUNDS, OXIDES, •NIOBIUM, •TANTALUM, NIOBIUM COMPOUNDS, TANTALUM COMPOUNDS, OXYGEN, •OXIDATION, X-RAY DIFFRACTION ANALYSIS.) (METALS, CRYSTAL STRUCTURE, LATTICES, PHASE TRANSITIONS.)

AD-273 214 62-2-5 DIV. 17
CENTRAL INST. FOR INDUSTRIAL RESEARCH (NOR•AY). (PHASE STUDIES, •TANTALUM, OXYGEN, •OXIDATION, •REACTION KINETICS, SOLUBILITY.) (X-RAY DIFFRACTION ANALYSIS, LATTICES, MICROSTRUCTURE, TANTALUM COMPOUNDS, OXIDES.) (ELECTRON DIFFRACTION ANALYSIS, ELECTRON MICROSCOPY, METALLURGICAL ANALYSIS HARDNESS.)

AD-273 216 62-2-5 DIV. 17
CENTRAL INST. FOR INDUSTRIAL RESEARCH (NOR•AY).
(•NIOBIUM, •TANTALUM, HIGH TEMPERATURE RESEARCH, OXIDATION, •PHASE STUDIES, NIOBIUM COMPOUNDS, TANTALUM COMPOUNDS, OXIDES, X-RAY DIFFRACTION ANALYSIS, ELECTRON DIFFRACTION ANALYSIS, MICROSTRUCTURE, SHEETS, POWDER METALS.

•TANTALUM ALLOYS

AD-273 082 62-2-5 DIV. 17
NATIONAL RESEARCH CORP., CAMBRIDGE, MASS.
(•TANTALUM ALLOYS, •TUNGSTEN ALLOYS, •ROCKET MOTOR NOZZLES, ALLOYS, CARBONIZATION, TANTALUM COMPOUNDS, TUNGSTEN COMPOUNDS, CARBIDES, PROCESSING.) (MECHANICAL PROPERTIES, PHYSICAL PROPERTIES, TENSILE PROPERTIES, TRANSITION TEMPERATURE, MELTING TEMPERATURE, THERMAL CONDUCTIVITY, THERMAL EXPANSION, MICROSTRUCTURE.) (EXHAUST NOZZLES, CONTROL SURFACES, EROSION BY EXHAUST GASES, TESTS.) HEAT RESISTANT ALLOYS.

•TAYLOR'S SERIES

AD-273 070 62-2-5 DIV. 25
ISRAEL INST. OF TECH., HAIFA.
(•CONICAL BODIES, •BUCKLING, TEMPERATURE, PRESSURE, •THERMAL STRESSES.) (•TAYLOR'S SERIES, DIFFERENTIAL EQUATIONS, POLYNOMIALS, INTEGRAL EQUATIONS, MATRIX ALGEBRA.)

•TELLURIUM COMPOUNDS

AD-273 045 62-2-5 DIV. 4
AEROSPACE CORP., LOS ANGELES, CALIF.
(•FLUORIDES OR •OXYFLUORIDES OF •SULFUR COMPOUNDS, •SELENIUM COMPOUNDS, •TELLURIUM COMPOUNDS, SYNTHESIS, CHEMICAL REACTIONS, PHYSICAL PROPERTIES, THERMODYNAMICS, HEAT OF FORMATION.)

•TEMPERATURE

AD-273 091 62-2-5 DIV. 17
TECHNICAL U. OF NORWAY, TRONDHEIM.
(•METALS, •ARC WELDING, WELDING FLUXES, SLAGS, SHIELDING, ELECTRIC ARCS.) (ARC WELDS, •WELDED JOINTS, •TEMPERATURE MEASUREMENT.) (HEAT TRANSFER, ELECTRIC ARCS, THEORY, ANALYSIS, CALORIMETERS, ELECTRIC CURRENTS, ELECTRIC POTENTIAL.) THERMOELECTRICITY METALLURGICAL ANALYSIS, CRYSTAL STRUCTURE, MICROSTRUCTURE.

•TERMINAL BALLISTICS

AD-273 315 62-2-5 DIV. 22
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION, WASHINGTON, D. C.
(•TERMINAL BALLISTICS OF PLASTICS, •PROJECTILES ON ALUMINUM ALLOYS, TARGETS, MOTION, VELOCITY, MEASUREMENT, PENETRATION, IMPACT SHOCK.) HYPERVELOCITY PROJECTILES, METEORITES, SATELLITE VEHICLES.

•TEST FACILITIES

AD-273 225 62-2-5 DIV. 30
HRB-SINGER, INC., STATE COLLEGE, PA.
(RADIOFREQUENCY, MICROWAVE FREQUENCY, •ELECTROMAGNETIC WAVES, •WAVE TRANSMISSION, •ANECHOIC CHAMBERS, DESIGN, SPECIFICATIONS, INSTRUMENTATION.) (•TEST FACILITIES FOR RADIOFREQUENCY INTERFERENCE, MEASUREMENT, ANTENNA RADIATION PATTERNS, ELECTROMAGNETIC SHIELDING, RESONANCE ABSORPTION, MATERIALS.)

AD-273 281 62-2-5 DIV. 20
•WESTINGHOUSE ELECTRIC CORP., BLAIRSVILLE, PA.
(AIR FORCE RESEARCH, •TEST FACILITIES, •VACUUM FURNACES, ELECTRIC ARCS, DESIGN, OPERATION.) (ALLOYS, METALS, •MELTING, GRAINS (METALLURGY), CRYSTAL STRUCTURE.) ELECTRODES, STEEL, MOLYBDENUM ALLOYS, TITANIUM ALLOYS.)

•TEST METHODS

AD-273 098 62-2-5 DIV. 16
AEROSPACE MEDICAL LAB., AERONAUTICAL SYSTEMS DIV., •WRIGHT-PATTERSON AIR FORCE BASE, OHIO.
(•WEIGHTLESSNESS, •SPACE MEDICINE, MAN.) (TEST METHODS, AIRBORNE, FLIGHT TESTING, •ATE, SIMULATION, ROTATION.) (BEHAVIOR, STRESS (PSYCHOLOGY), SENSORY PERCEPTION, REACTION (PSYCHOLOGY).) (STRESS (PHYSIOLOGY), HEART, LAB, MOTION SICKNESS, MOTOR REACTIONS.)

•TEST SETS

AD-273 148 62-2-5 DIV. 30
PANORAMIC RADIO PRODUCTS, INC., MOUNT VERNON, N. Y.
(•RADIOFREQUENCY SPECTRUM ANALYZERS, HIGH FREQUENCY, •SIGNAL GENERATORS, AUDIOFREQUENCY, •TEST SETS, DESIGN.) (SIDE BANDS, RADIO TRANSMITTERS, TEST EQUIPMENT, TRANSISTORS, •NAVAL EQUIPMENT, SPECIFICATIONS.)

AD-273 421 62-2-5 DIV. 8
GENERAL COMMUNICATION CO., BOSTON, MASS.
(DESIGN, MANUFACTURING METHODS, PRODUCTION OF •TEST SETS, RADAR BEACONS FOR TESTS ON RADAR EQUIPMENT IN C BAND, S BAND, A BAND.)

•TESTS

AD-273 435 62-2-5 DIV. 12
BOEING CO., SEATTLE, WASH.
(•ROCKET MOTORS, •EXHAUST GASES, •EXHAUST FLAMES, DETECTION, •WIND TUNNELS, •TESTS, INFRARED RADIATION, SPECTROGRAPHIC ANALYSIS, MEASUREMENT.) (ALTITUDE CHAMBERS, SIMULATION.) (INSTRUMENTATION, RADIOMETERS SPECTROPHOTOMETERS.) (EXPERIMENTAL DATA, TABLES.) (LIQUID ROCKET PROPELLANTS, SOLID ROCKET PROPELLANTS.)

•THEORY

AD-273 245 62-2-5 DIV. 8
MICROWAVE LAB., STANFORD U., CALIF.
(•MICROWAVES, MICROWAVE FREQUENCY, •THEORY, •OPTICS, FREQUENCY, •MASERS, INFRARED RADIATION.) MATERIALS.

AD-273 300 62-2-5 DIV. 30
GRUMMAN AIRCRAFT ENGINEERING CORP., BETHPAGE, N. Y.
((ABSTRACT) •THEORY OF EFFECTIVENESS OF (COMPUTABLE) •FUNCTIONS.) (•AUTOMATION, STATISTICAL ANALYSIS (DECISION THEORY), •MATHEMATICAL LOGIC, •METAMATHEMATICS, MATRIX ALGEBRA, ANALYSIS (RECURSIVE).) (RECURSIVE FUNCTIONS) COMPUTERS.)

•THERMAL CONDUCTIVITY

AD-273 089 62-2-5 DIV. 25
AERONAUTICAL ELECTRONIC AND ELECTRICAL LAB., NAVAL AIR DEVELOPMENT CENTER, JOHNSVILLE, PA.
(•HEAT TRANSFER AND •THERMAL CONDUCTIVITY IN FINS AND METAL PLATES.) (COOLING, TEMPERATURE, MEASUREMENT.) (DIFFERENTIAL EQUATIONS, INTEGRAL TRANSFORMS, PARTIAL DIFFERENTIAL EQUATIONS.)

AD-273 119 62-2-5 DIV. 25
ALLIED RESEARCH ASSOCIATES, INC., BOSTON, MASS.
(•HEAT TRANSFER, •SOLIDS, SHEETS, •THERMAL CONDUCTIVITY.) (•INTEGRAL EQUATIONS, DIFFERENTIAL EQUATIONS, NUMERICAL ANALYSIS.)

•THERMAL INSULATION

AD-273 316 62-2-5 DIV. 9
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION, WASHINGTON, D. C.
(•RE-ENTRY VEHICLES, AERODYNAMIC HEATING, RE-ENTRY AERODYNAMICS, AERODYNAMICS, SUPERSONICS, AIRFRAMES, •THERMAL INSULATION •SHIELDING, COUNTERMEASURES, MODEL TESTS, •INOTUNNEL MODELS.)

•THERMAL NEUTRONS

AD-273 279 62-2-5 DIV. 20
WATERTOWN ARSENAL LABS., MASS.
(•THERMAL NEUTRONS, •NEUTRON BEAMS, •RADIOGRAPHY, INDUSTRIAL RADIOGRAPHY, ORDNANCE, MATERIALS.) FEASIBILITY STUDIES.

•THERMAL RADIATION

AD-273 348 62-2-5 DIV. 27
BENDIX SYSTEMS DIV., BENDIX CORP., ANN ARBOR, MICH.
(•PARTICLES IN ROCKET MOTOR NOZZLES, •EXHAUST GASES, •THERMAL RADIATION, TEMPERATURE, MATHEMATICAL ANALYSIS, EQUATIONS OF MOTION.) (ROCKET MOTORS, ROCKET FUELS, CESIUM COMPOUNDS, NITRATES, ALUMINUM.)

•THERMAL STRESSES

AD-273 070 62-2-5 DIV. 25
ISRAEL INST. OF TECH., HAIFA.
(•CONICAL BODIES, •BUCKLING, TEMPERATURE, PRESSURE, •THERMAL STRESSES.) (•TAYLOR'S SERIES, DIFFERENTIAL EQUATIONS, POLYNOMIALS, INTEGRAL EQUATIONS, MATRIX ALGEBRA.)

•THERMIONIC EMISSION

AD-273 223 62-2-5 DIV. 29
ALLISON DIV., GENERAL MOTORS CORP., INDIANAPOLIS, IND.
(•KINETIC THEORY OF GASES, •CESIUM, GAS FLOW THROUGH CAPILLARY TUBES FOR •THERMIONIC EMISSION OF •IONS, •ELECTRON PLASMA PHYSICS,) (TUNGSTEN, MOLYBDENUM, TANTALUM,) (INTEGRAL EQUATIONS, DIFFERENTIAL EQUATIONS, MATRIX ALGEBRA, NUMERICAL ANALYSIS, GREEN'S FUNCTION,) INSTRUMENTATION.

AD-273 041 62-2-5 DIV. 8
SPERRY SYRACUSE CO., SYRACUSE, N. Y.
(•OXIDE CATHODES, •CATHODES (ELECTRON TUBES), BARIUM COMPOUNDS, OXIDES, RARE EARTHS, IONS, STRONTIUM COMPOUNDS, IMPURITIES, •THERMIONIC EMISSION, WORK FUNCTION, TEMPERATURE, FLUORESCENCE, MEASUREMENT,) (DIODES, ELECTRON TUBES, PHOTOEMISSION, TEST EQUIPMENT, DESIGN,)

•THERMISTORS

AD-273 172 62-2-5 DIV. 8
DAVISON CHEMICAL CO., BALTIMORE, MD.
(PRODUCTION, MANUFACTURING METHODS, •RESISTORS, •THERMISTORS, •SEMICONDUCTORS OF SINGLE CRYSTALS OF •SILICON WITH CHEMICAL IMPURITIES, GOLD, DIFFUSION, ALUMINUM, ELECTRODES,) ZONE MELTING.

•THERMOCHEMISTRY

AD-273 265 62-2-5 DIV. 10
ROCKET POWER, INC., PASADENA, CALIF.
(•ALUMINUM COMPOUNDS, •OXYFLUORIDES, •OXIDES, FLUORIDES, HEAT OF FORMATION, CHEMICAL REACTIONS, •THERMOCHEMISTRY,) (BORON COMPOUNDS, IONIC ACIDS, CHEMICAL REACTIONS, OXIDES, •ATER,) (SOLID ROCKET PROPELLANTS, ALUMINUM COMPOUNDS, THERMODYNAMICS,)

•THERMODYNAMICS

AD-273 309 62-2-5 DIV. 25
AEROPHYSICS LAB., MASS. INST. OF TECH., CAMBRIDGE,
(•THERMODYNAMICS, THERMAL DIFFUSION AND HEAT TRANSFER IN BOUNDARY LAYERS, •LAMINAR BOUNDARY LAYERS,) (TRANSPORT PROPERTIES, RELAXATION TIME, HELIUM, AIR, GAS FLOW, COOLANTS, COOLING,)

•THERMOELECTRICITY

AD-273 218 62-2-5 DIV. 25
ARIZONA STATE U., TEMPE,
(•SEMICONDUCTING FILMS, •SEMICONDUCTORS, MATERIALS, CERAMIC MATERIALS, •TITANIUM COMPOUNDS, DIOXIDES, COLLOIDS, IMPURITIES, CONDUCTIVITY, •THERMOELECTRICITY, HIGH TEMPERATURE RESEARCH, STABILITY, CRYSTALS, SINGLE CRYSTALS,) •CRYSTAL RECTIFIERS.

•THIN FILMS

AD-273 149 62-2-5 DIV. 25
RESEARCH LAB. OF ELECTRONICS, MASS. INST. OF TECH., CAMBRIDGE,
(•SOLID STATE PHYSICS, ELECTRON BEAMS, •THIN FILMS, •MAGNETO-OPTIC ROTATION, COBALT, DIELECTRICS, FERROMAGNETIC MATERIAL, MAGNETIC EFFECTS, PERTURBATION THEORY,) (MOLECULAR STRUCTURE, FEEDBACK,) (LATTICES, CRYSTAL STRUCTURE, INTERMETALLIC COMPOUNDS, TIN COMPOUNDS, COPPER COMPOUNDS, IRON COMPOUNDS, ALGEBRAS,) (COMPUTERS, •DIGITAL COMPUTERS,) COMPUTER SYSTEMS THEORY.

AD-273 171 62-2-5 DIV. 8
GENERAL ELECTRIC CO., OWENSBORO, KY.
(•THIN FILMS, •ELECTRON TUBES, ANALYSIS,) (FILMS, •SPECTROGRAPHIC ANALYSIS, OPTICAL ANALYSIS, X-RAY SPECTROSCOPY, MASS SPECTROSCOPY, THEORY,) (DIODES, TRIODES, TESTS, LIFE EXPECTANCY,)

AD-273 239 62-2-5 DIV. 26
LINCOLN LAB., MASS. INST. OF TECH., LEXINGTON,
(EVAPORATION OF NICKEL ALLOYS AND IRON ALLOYS AND DEPOSITS AS •THIN FILMS USING AUTOMATIC •VACUUM APPARATUS WITH INDUCTION HEATING,)

•TIME DELAY FUZES

AD-273 162 62-2-5 DIV. 22
•WHIRLPOOL CORP., EVANSVILLE, IND.
(HOWITZERS, GUNS, •PROJECTILE FUZES, •TIME DELAY FUZES, •POINT DETONATING FUZES, DETONATORS, PHOTOGRAPHIC ANALYSIS,

•TITANATES

AD-273 424 62-2-5 DIV. 8
CONNELL-DUBILIER ELECTRIC CORP., NEW BEDFORD, MASS,
(•CAPACITORS, •CERAMIC CAPACITORS, MATERIALS, •DIELECTRICS, •BARIUM COMPOUNDS, CALCIUM COMPOUNDS, •TITANATES, FLUORINATION, HIGH TEMPERATURE RESEARCH, ENCAPSULATION, MANUFACTURING METHODS, INDUSTRIAL PRODUCTION, DIELECTRIC PROPERTIES,)

•TITANIUM ALLOYS

AD-273 039 62-2-5 DIV. 17
ARMOUR RESEARCH FOUNDATION, CHICAGO, ILL.
(•TITANIUM ALLOYS, •SHEETS, •WELDING, HEAT TREATMENT, ELECTROMAGNETIC EFFECTS, VIBRATION, AGING,) (ARC WELDING, MAGNETIC WAVES, ABSORPTION, EXCITATION,) (FOURIER ANALYSIS, INTEGRAL TRANSFORMS, PERTURBATION THEORY, PROBABILITY,)

AD-273 052 62-2-5 DIV. 26
WESTERN GEAR CORP., LYNWOOD, CALIF.
(•FORGING, ALLOYS, •HEAT RESISTANT ALLOYS, •REFRACTORY MATERIALS, •STEEL, STAINLESS STEEL, •TOOL STEEL, •TITANIUM ALLOYS,) (TEMPERATURE, PRESSURE, DEFORMATION, HEAT TREATMENT,) (MICROSTRUCTURE, TENSILE PROPERTIES, MECHANICAL PROPERTIES,) INDUSTRIAL EQUIPMENT.

AD-273 065 62-2-5 DIV. 14
GENERAL DYNAMICS/ASTRONAUTICS, SAN DIEGO, CALIF.
(•ALLOYS, •METALS, •PLASTICS, EXPANDED PLASTICS, •GLASS TEXTILES, LAMINATES, SHEETS, METAL PLATES, TITANIUM, •TITANIUM ALLOYS, •ALUMINUM ALLOYS, •STAINLESS STEEL, •STEEL, •NICKEL ALLOYS,) (LOW TEMPERATURE RESEARCH, CRYOGENICS, MECHANICAL PROPERTIES, PHYSICAL PROPERTIES, FATIGUE (MECHANICS), CORROSION,) (MARTENSITE, X-RAY DIFFRACTION ANALYSIS,) (THERMAL EXPANSION, MEASUREMENT)

AD-273 165 62-2-5 DIV. 17
REACTIVE METALS, INC., NILES, OHIO.
(•MANUFACTURING METHODS, PRODUCTION, PROCESSING, METAL PLATES, •SHEETS, •TITANIUM ALLOYS (TI-7AL-12ZR), ALUMINUM ALLOYS, ZIRCONIUM ALLOYS,) (TENSILE PROPERTIES, CREEP, MICROSTRUCTURE, SURFACE PROPERTIES, CONTAMINATION,) (MELTING, ELECTRIC ARCS, VACUUM FURNACES, FORGE PRESSES, ROLLING MILLS, HEAT TREATMENT, CLEANING,)

AD-273 223 62-2-5 DIV. 17
GENERAL DYNAMICS/ASTRONAUTICS, SAN DIEGO, CALIF.
(•RADIATION EFFECTS OF NUCLEAR ENERGY ON ALLOYS, •STAINLESS STEEL (301) (310), •TITANIUM ALLOYS (A110AT), •ALUMINUM ALLOYS (2014-T6), CRYOGENICS, LIQUEFIED GASES, HYDROGEN,) (TESTS, MECHANICAL PROPERTIES, TENSILE PROPERTIES, ELASTICITY, DEFORMATION,)

AD-273 297 62-2-5 DIV. 27
DEFENSE METALS INFORMATION CENTER, COLUMBUS, OHIO.
(•ROCKET CASES, MATERIALS, •STEEL, •TITANIUM ALLOYS, LAMINATES, FILAMENT WOUND CONSTRUCTION, GLASS TEXTILES, PLASTICS, EFFECTIVENESS, DESIGN,) (STRESSES, DEFORMATION, MECHANICAL PROPERTIES, PHYSICAL PROPERTIES, BUCKLING, ELASTICITY, DENSITY,)

•TITANIUM COMPOUNDS

AD-273 126 62-2-5 DIV. 4
FELTMAN RESEARCH LABS., PICATINNY ARSENAL, DOVER, N. J.
(SYNTHESIS OF •CATALYSTS, METAL-ORGANIC COMPOUNDS AND SALTS OF •ALUMINUM COMPOUNDS AND •ALKYL RADICALS, •TITANIUM COMPOUNDS AND •HALIDES, •COMPLEX COMPOUNDS,) (CATALYSIS, POLYMERIZATION, STEREOCHEMISTRY, MOLECULAR ISOMERISM,)

AD-273 218 62-2-5 DIV. 25
ARIZONA STATE U., TEMPE,
(•SEMICONDUCTING FILMS, •SEMICONDUCTORS, MATERIALS, CERAMIC MATERIALS, •TITANIUM COMPOUNDS, DIOXIDES, COLLOIDS, IMPURITIES, CONDUCTIVITY, •THERMOELECTRICITY, HIGH TEMPERATURE RESEARCH, STABILITY, CRYSTALS, SINGLE CRYSTALS,) •CRYSTAL RECTIFIERS.

•TOOL STEEL

AD-273 052 62-2-5 DIV. 26
WESTERN GEAR CORP., LYNWOOD, CALIF.
(•FORGING, ALLOYS, •HEAT RESISTANT ALLOYS, •REFRACTORY MATERIALS, •STEEL, STAINLESS STEEL, •TOOL STEEL, •TITANIUM ALLOYS,) (TEMPERATURE, PRESSURE, DEFORMATION, HEAT TREATMENT,) (MICROSTRUCTURE, TENSILE PROPERTIES, MECHANICAL PROPERTIES,) INDUSTRIAL EQUIPMENT.

•TRAINING

AD-273 449 62-2-5 DIV. 23
DUNLAP AND ASSOCIATES, INC., STAMFORD, CONN.
(•TRAINING, EFFECTIVENESS OF •AVIATION PERSONNEL FOR SPACE FLIGHT, STIMULATION,) •SELECTION, STRESS (PSYCHOLOGY),

•TRANSFORMATIONS (MATHEMATICS)

AD-273 025 62-2-5 DIV. 25
MICROWAVE RESEARCH INST., POLYTECHNIC INST. OF BROOKLYN, N. Y.
(•ELECTROMAGNETIC THEORY, •QUANTUM MECHANICS,) (•ELECTROMAGNETIC WAVES, •DIFFRACTION, •OPERATORS (MATHEMATICS), •TRANSFORMATIONS (MATHEMATICS), VECTOR ANALYSIS, MATRIX ALGEBRA, ALGEBRA, GREEN'S FUNCTION, PERTURBATION THEORY,)

AD-273 235 62-2-5 DIV. 30
LITTON SYSTEMS, INC., •WALTHAM, MASS,
(•PROGRAMMING, PATTERN RECOGNITION, •SAMPLING, •DATA PROCESSING SYSTEMS, AUTOMATIC, DECISION THEORY, •STATISTICAL ANALYSIS,) (DIGITAL COMPUTERS, TESTS, SIGNAL-TO-NOISE RATIO,) (INTEGRAL EQUATIONS, MATRIX ALGEBRA, TIME, •TRANSFORMATIONS (MATHEMATICS), SEQUENCES, TAYLOR'S SERIES, STATISTICAL DISTRIBUTIONS, PROBABILITY, INEQUALITIES,)

•TRANSISTORS

AD-273 139 62-2-5 DIV. 8
MOTOROLA, INC., PHOENIX, ARIZ.
(•TRANSISTORS, •DIELECTRICS, •GERMANIUM, •SILICON, •SEMICONDUCTORS, SURFACES, SURFACE PROPERTIES, DIELECTRIC PROPERTIES,) (PROCESSING, AGING, ENCAPSULATION, CONTROLLED ATMOSPHERES, CONTROL OF WATER VAPOR WITH BARIUM COMPOUNDS, OXIDES, NITROGEN, OXYGEN, HYDROGEN COMPOUNDS, BORON COMPOUNDS, DIOXIDES,) (OXIDATION, SILICON, SILICON COMPOUNDS, DIOXIDES, TEMPERATURE,)

AD-273 270 62-2-5 DIV. 8
RADIO CORP. OF AMERICA, SOMERVILLE, N. J.
(•TRANSISTORS, SILICON, DIOXIDES, SILICON COMPOUNDS, DIFFUSION, VERY HIGH FREQUENCY, •MANUFACTURING METHODS, PRODUCTION,) (CONTAINERS, GOLD PLATING, CLIMATIC FACTORS, PROCESSING,)

AD-273 416 62-2-5 DIV. 8
ELECTRICAL ENGINEERING RESEARCH LAB., U. OF ILLINOIS, URBANA,
(•ELECTRICAL NETWORKS, SYNTHESIS, •SWITCHING CIRCUITS, •PROGRAMMING, •TRANSISTORS, DIODES, FEEDBACK, LINEAR SYSTEMS,) (•POLYNOMIALS, LEAST SQUARES METHOD, SERIES PROBABILITY, TABLES, EXPERIMENTAL DATA,)

AD-273 439 62-2-5 DIV. 8
RADIO CORP. OF AMERICA, SOMERVILLE, N. J.
(•TRANSISTORS, SILICON, ELECTRICAL PROPERTIES, MECHANICAL PROPERTIES, RESISTANCE, TEMPERATURE, •MANUFACTURING METHODS, PROCESSING, PACKAGING, PRODUCTION, DIFFUSION,)

•TRANSLATIONS

AD-273 414 62-2-5 DIV. 30
THOMAS J. WATSON RESEARCH CENTER, YORKTOWN HEIGHTS, N. Y.
(•DIGITAL COMPUTERS, CODING, •LANGUAGE, •TRANSLATIONS, •DATA PROCESSING SYSTEMS, AUTOMATION,)

•TRANSONICS

AD-273 110 62-2-5 DIV. 9
ROME U. (ITALY),
(•RE-ENTRY VEHICLES, ATMOSPHERIC ENTRY, •ORBITAL FLIGHT PATHS, •RE-ENTRY AERODYNAMICS, •TRANSONICS, LIFT, DRAG,) (PERTURBATION THEORY, INTEGRATION,)

•TUNGSTEN

AD-273 020 62-2-5 DIV. 17
FANSTEEL METALLURGICAL CORP., NORTH CHICAGO, ILL.
(PRODUCTION AND PROCESSING OF •TUNGSTEN, •SHEETS,) (•MANUFACTURING METHODS, PREPARATION OF POWDER METALS BY HYDROGEN REDUCTION OF AMMONIUM RADICALS, TUNGSTATES BY POWDER METALLURGY, SINTERING AND ROLLING MILLS,) (TRANSITION TEMPERATURE, HEAT TREATMENT, DEFORMATION, MECHANICAL PROPERTIES, TENSILE PROPERTIES,)

AD-273 177 62-2-5 DIV. 17
BATTELLE MEMORIAL INST., COLUMBUS, OHIO.
(PREPARATION, SHEETS, •TUNGSTEN, •TUNGSTEN ALLOYS, THORIUM COMPOUNDS, ZIRCONIUM COMPOUNDS, CARBIDES, •NIOBIUM ALLOYS, RUTHENIUM, HEAT RESISTANT ALLOYS, REFRACTORY MATERIALS, PRODUCTION, POWDER ALLOYS, POWDER METALLURGY, SINTERING, SINTERED ALLOYS, ROLLING MILLS, SOLUTIONS, SOLID STATE PHYSICS, DEFORMATION HARDENING, GRAINS (METALLURGY), TRANSITION TEMPERATURE, PHASE TRANSITIONS,
LS, DISPERSION HARDENING, OSMIUM, IRIDIUM ALLOYS, PLATINUM ALLOYS,)

***TUNGSTEN ALLOYS**

AD-273 082 62-2-5 DIV. 17
NATIONAL RESEARCH CORP., CAMBRIDGE, MASS.
(*TANTALUM ALLOYS, *TUNGSTEN ALLOYS, *ROCKET MOTOR NOZZLES, ALLOYS, CARBONIZATION, TANTALUM COMPOUNDS, TUNGSTEN COMPOUNDS, CARBIDES, PROCESSING.) (MECHANICAL PROPERTIES, PHYSICAL PROPERTIES, TENSILE PROPERTIES, TRANSITION TEMPERATURE, MELTING TEMPERATURE, THERMAL CONDUCTIVITY, THERMAL EXPANSION, MICROSTRUCTURE.) (EXHAUST NOZZLES, CONTROL SURFACES, EROSION BY EXHAUST GASES, TESTS.) HEAT RESISTANT ALLOYS.

AD-273 177 62-2-5 DIV. 17

BATTELLE MEMORIAL INST., COLUMBUS, OHIO.
(PREPARATION, SHEETS, *TUNGSTEN, *TUNGSTEN ALLOYS, THORIUM COMPOUNDS, ZIRCONIUM COMPOUNDS, OXIDES, RHENIUM ALLOYS, RUTHENIUM, HEAT RESISTANT ALLOYS, REFRACTORY MATERIALS PRODUCTION, POWDER ALLOYS, POWDER METALLURGY, SINTERING, SINTERED ALLOYS, ROLLING MILLS, SOLUTIONS, SOLID STATE PHYSICS, DEFORMATION HARDNESS, MICROSTRUCTURE, MECHANICAL PROPERTIES, GRAINS (METALLURGY), TRANSITION TEMPERATURE, PHASE TRANSITIONS.

***TURBOJET ENGINES**

AD-273 147 62-2-5 DIV. 27
PHILLIPS PETROLEUM CO., BARTLESVILLE, OKLA.
(*TURBOJET ENGINES, DUCT INLETS, *GUIDE VANES, RELIABILITY, CORROSION, SULFUR, SEA WATER, TESTS.) (COMBUSTION CHAMBERS, COMBUSTION CHAMBER LINERS, CORROSION, EROSION, FLAMES, COMBUSTION CHAMBER GASES, TESTS.) (HYDROCARBONS, *JET ENGINE FUELS, COMBUSTION, HIGH TEMPERATURE RESEARCH.) STAINLESS STEEL, TEST EQUIPMENT.

***TURBULENT FLOW**

AD-273 205 62-2-5 DIV. 9
BALLISTIC RESEARCH LABS., ABERDEEN PROVING GROUND, MD.
(*SHOCK WAVES, *BLAST, SPHERES, *TURBULENT FLOW, SPACE CHARGES.) (HYDRODYNAMICS, EQUATIONS, PARTICLES, VELOCITY.) (PIEZOELECTRIC GAGES, MEASUREMENT.) (*NUMERICAL ANALYSIS, *INTEGRATION, PARTIAL DIFFERENTIAL EQUATIONS.) DIGITAL COMPUTERS.

AD-273 274 62-2-5 DIV. 9
PRINCETON U., N. J.
(*GAS FLOW, OSCILLATION, *HEAT TRANSFER, *TURBULENT FLOW, DUCT INLETS, MACH NUMBER, PRESSURE, SHOCK WAVES.) (INSTRUMENTATION, HEATERS, ANEMOMETERS.)

***ULTRASONICS**

AD-273 339 62-2-5 DIV. 20
AEROPROJECTS, INC., WEST CHESTER, PA.
(HEAT RESISTANT ALLOYS, REFRACTORY MATERIALS, METALS, ALLOYS, SHEETS, METAL PLATES, *WELDING, ULTRASONICS, ENERGY TRANSDUCERS, *INDUSTRIAL EQUIPMENT,) *WELDED JOINTS, NICKEL-ALLOYS, NIOBIUM ALLOYS (D-91), COBALT ALLOYS, CHROMIUM ALLOYS, MOLYBDENUM ALLOYS, TITANIUM ALLOYS, IRON ALLOYS, STEEL, STAINLESS STEEL, TUNGSTEN.

***ULTRAVIOLET RADIATION**

AD-273 256 62-2-5 DIV. 30
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION, WASHINGTON, D. C.
(SPACE ENVIRONMENTAL CONDITIONS, *ULTRAVIOLET RADIATION, MEASUREMENT BY *IONIZATION CHAMBERS, MANUFACTURING METHODS, DESIGN, CALIBRATION, VACUUM APPARATUS,) (SATELLITE VEHICLES, SPACE PROBES, INSTRUMENTATION,) (MATERIALS, CERAMIC MATERIALS,)

***UNDERGROUND EXPLOSIONS**

AD-273 327 62-2-5 DIV. 2
SANDIA LAB., ALBUQUERQUE, N. MEX.
(UNDERGROUND EXPLOSIONS, *NUCLEAR EXPLOSIONS, *MICROBAROMETRIC WAVES, MEASUREMENT, METEOROLOGY,) MICROBAROMETERS.

AD-273 402 62-2-5 DIV. 25
FOREIGN TECH. DIV., AIR FORCE SYSTEMS COMMAND, *RIGHT-PATTERSON AIR FORCE BASE, OHIO.
(*SEISMIC WAVES, PROPAGATION, *UNDERGROUND EXPLOSIONS, USSR, *WAVE TRANSMISSION,) (SOLIDS, *DEMOLITION,)

***UNDERGROUND STRUCTURES**

AD-273 229 62-2-5 DIV. 13
IOWA STATE U. OF SCIENCE AND TECH., AMES.
(*UNDERGROUND STRUCTURES, *SOILS, *EARTH MODELS, BLAST, LOAD DISTRIBUTION, PRESSURE, STRESSES, SIMULATION, IMPACT SHOCK, MATHEMATICAL ANALYSIS, MODEL TESTS,)

***UREA**

AD-273 049 62-2-5 DIV. 7
LOCKHEED AIRCRAFT CORP., SUNNYVALE, CALIF.
(*FUEL CELLS, *JET CELLS, *ELECTROLYTIC CELLS, ELECTRODES, *ANODES (ELECTROLYTIC CELL), *CATHODES (ELECTROLYTIC CELL), CATALYSTS, PLATINUM, *FUELS, *AMMONIA, ETHYLENES, *GLYCOLS, *UREA, ELECTROLYTES, POTASSIUM COMPOUNDS, HYDROXIDES, CARBONATES,)

***VACUUM APPARATUS**

AD-273 239 62-2-5 DIV. 20
LINCOLN LAB., MASS. INST. OF TECH., LEXINGTON,
(EVAPORATION OF NICKEL ALLOYS AND IRON ALLOYS AND DEPOSITS AS *THIN FILMS USING AUTOMATIC *VACUUM APPARATUS WITH INDUCTION HEATING,)

***VACUUM FURNACES**

AD-273 281 62-2-5 DIV. 20
WESTINGHOUSE ELECTRIC CORP., BLAIRSVILLE, PA.
(AIR FORCE RESEARCH, *TEST FACILITIES, *VACUUM FURNACES, ELECTRIC ARCS, DESIGN, OPERATION,) (ALLOYS, METALS, *MELTING, GRAINS (METALLURGY), CRYSTAL STRUCTURE,) ELECTRODES, STEEL, MOLYBDENUM ALLOYS, TITANIUM ALLOYS,)

***VANADIUM ALLOYS**

AD-273 119 62-2-5 DIV. 17
ARMOUR RESEARCH FOUNDATION, CHICAGO, ILL.
(ALLOYS, HEAT RESISTANT ALLOYS, HIGH TEMPERATURE RESEARCH, *VANADIUM ALLOYS TITANIUM ALLOYS, NIOBIUM ALLOYS, COATINGS, *ANTIOXIDANTS, OXIDATION INHIBITORS, *METAL COATINGS, NICKEL PLATING, *CERAMIC COATINGS SILICON COATINGS,) (FLAME SPRAYING, ELECTRODEPOSITION, INTERMETALLIC COMPOUNDS, NICKEL COMPOUNDS, YTTRIUM COMPOUNDS, OXIDES, BORON COMPOUNDS, SILICIDES,) (TESTS, MECHANICAL PROPERTIES, DEFORMATION, TENSILE PROPERTIES)

***VARIABLE CAPACITORS**

AD-273 170 62-2-5 DIV. 8
GENERAL ELECTRIC CO., OWENSBORO, KY.
(*ELECTRONIC CIRCUITS, HIGH TEMPERATURE RESEARCH, THERMIONIC EMISSION, RADIATION DAMAGE,) (CIRCUITS, *ELECTRON TUBES, *DIODES, TRIODES, ELECTRICAL PROPERTIES, MECHANICAL PROPERTIES, PROCESSING, MATERIALS, SHOCK RESISTANCE, LIFE EXPECTANCY, TITANIUM,) (*RESISTORS, *CARBON RESISTORS, MATERIALS, TUNGSTEN, MOLYBDENUM, LIFE EXPECTANCY,) (*CAPACITORS, MATERIALS, DIELECTRICS, CERAMIC MATERIALS, *VARIABLE CAPACITORS, *MICA CAPACITORS,) TEST EQUIPMENT.

***VERTICAL TAKE-OFF PLANES**

AD-273 050 62-2-5 DIV. 1
PRINCETON U., N. J.
(*MILITARY AIRCRAFT, *MILITARY RESEARCH, *SCIENTIFIC RESEARCH, RESEARCH PROGRAM ADMINISTRATION,) (*VERTICAL TAKE-OFF PLANES, SHORT TAKE-OFF PLANES, *FLYING PLATFORMS, HELICOPTERS, GROUND EFFECT, STABILITY, CONTROL, MODEL TESTS, THEORY, MATHEMATICAL ANALYSIS,) (AIRCRAFT, AIRPLANES, ELECTRICAL PROPERTIES, THEORY,) (TEST FACILITIES, *WIND TUNNELS, DESIGN,) *BIBLIOGRAPHY.

AD-273 086 62-2-5 DIV. 1
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION, WASHINGTON, D. C.
(*VERTICAL TAKE-OFF PLANES, HELICOPTERS, CONTROL, PITCH, ROLL, ERRORS, FLIGHT TESTING,)

***VIBRATION**

AD-273 023 62-2-5 DIV. 12
SPACE TECHNOLOGY LABS., INC., LOS ANGELES, CALIF.
(*SATELLITE VEHICLES, INTERNAL MOVING PARTS, *VIBRATION, ROTATION, *SATELLITE ATTITUDE, VECTOR ANALYSIS, ACCELERATION, TORQUE, MOMENTS, (FORCE),) (MATRIX ALGEBRA, DIFFERENTIAL EQUATIONS,)

AD-273 282 62-2-5 DIV. 1
DIRECTORATE OF ENGINEERING TEST, AERONAUTICAL SYSTEMS DIV., *RIGHT-PATTERSON AIR FORCE BASE, OHIO.
(*JET FIGHTERS, JET PLANES, AIRFRAMES, *VIBRATION, FLIGHT TESTING, MEASUREMENT,) (AIRCRAFT EQUIPMENT, ELECTRONIC EQUIPMENT, DESIGN,)

AD-273 334 62-2-5 DIV. 12
NORTHROP CORP., HAWTHORNE, CALIF.
(*SATELLITE VEHICLES, *GUIDED MISSILES, *BOOSTER ROCKETS, DYNAMICS, *VIBRATION, FATIGUE (MECHANICS), AIRFRAMES, STRUCTURES,) (VIBRATION FROM ROCKET MOTOR NOISE, EXHAUST GASES, TURBULENT BOUNDARY LAYER, OSCILLATION OF SHOCK WAVES, FLUTTER, TURBULENCE ATMOSPHERE, *WIND, METEORITES, COMBUSTION OF ROCKET MOTORS,) (VIBRATION, FATIGUE (MECHANICS), MATHEMATICAL ANALYSIS, INTEGRAL EQUATIONS, ANALYSIS, TEST METHODS, EXPERIMENTAL DATA,) AERODYNAMICS, GROUND EFFECT.

***VISION**

AD-273 230 62-2-5 DIV. 16
INDIANA U., BLOOMINGTON.
(*VISION, *OPTICAL FILTERS, *GOGGLES, EFFECTIVENESS,) (OPHTHALMOLOGY, VISUAL THRESHOLDS, TARGET RECOGNITION,)

***VOICE COMMUNICATION SYSTEMS**

AD-273 148 62-2-5 DIV. 1
NATIONAL AVIATION FACILITIES EXPERIMENTAL CENTER, ATLANTIC CITY, N. J.
DESCRIPTORS: *AIRPLANE LANDINGS, *VOICE COMMUNICATION SYSTEMS, *AIR TRAFFIC CONTROL SYSTEMS, *AUTOMATIC NAVIGATORS, *FLIGHT SIMULATORS, HEIGHT FINDING, DIRECTION FINDING, DETECTION, DISPLAY SYSTEMS, GLIDE PATH SYSTEMS, APPROACH LIGHTS, RUNWAYS, GROUND SPEED INDICATORS, RADIO COMMUNICATION SYSTEMS, PARAMETRIC AMPLIFIERS, *DATA PROCESSING SYSTEMS, DISPLAY SYSTEMS, RADAR EQUIPMENT, *SAFETY, SIMULATION, THEORY, GROUND CONTROLLED RADAR, DOPPLER SYSTEMS, ANTENNAS, DIRECTION FINDING,

***WAVE TRANSMISSION**

AD-273 225 62-2-5 DIV. 30
MRB-SINGER, INC., STATE COLLEGE, PA.
(RADIOFREQUENCY, *MICROWAVE FREQUENCY, *ELECTROMAGNETIC WAVES, *WAVE TRANSMISSION, *ANECHOIC CHAMBERS, DESIGN, SPECIFICATIONS, INSTRUMENTATION,) (*TEST FACILITIES FOR RADIOFREQUENCY, INTERFERENCE, MEASUREMENT, ANTENNA RADIATION PATTERNS, ELECTROMAGNETIC SHIELDING, RESONANCE ABSORPTION, MATERIALS,)

***WAVEFORM GENERATORS**

AD-273 003 62-2-5 DIV. 25
MICROWAVE LAB., STANFORD U., CALIF.
(FEASIBILITY STUDIES OF *WAVE FORM GENERATORS, *MICROWAVES, MAGNETIC FIELDS, RESONANCE ABSORPTION, SOLID STATE PHYSICS,) (ELECTROMAGNETIC WAVES, SHOCK WAVES IN *FERROMAGNETIC MATERIALS, SINGLE CRYSTALS, *FERRITES, DIELECTRICS,) (PARTIAL DIFFERENTIAL EQUATIONS, HARMONIC ANALYSIS, PERTURBATION THEORY,) X-RAY DIFFRACTION ANALYSIS.

***WAVEGUIDES**

AD-273 106 62-2-5 DIV. 8
HAZELTINE RESEARCH CORP., LITTLE NECK, N. Y.
(*PARABOLIC ANTENNAS, *RADAR ANTENNAS, L BAND, SEARCH RADAR, IDENTIFICATON SYSTEMS, MOBILE, ANTENNA RADIATION PATTERNS, *ANTENNA HORNS, ANTENNA HARDWARE, DESIGN,) (RADIOFREQUENCY CABLES, COAXIAL CABLES, TRANSMISSION LINES, COUPLED ANTENNAS, *WAVE GUIDES, STANDING WAVE RATIOS, MEASUREMENT,) (ANTENNAS, CONTROL SYSTEMS, CONTROL BOXES, CIRCUITS, SYNCHRO DATA, TESTS,) (RADAR ANTENNAS, SHELTERS,)

***WAVEMETERS**

AD-273 272 62-2-5 DIV. 8
AIRBORNE INSTRUMENTS LAB., INC., DEER PARK, LONG ISLAND, N. Y.
(*RADAR TRANSMITTERS, *RADIO TRANSMITTERS, MICROWAVE FREQUENCY, *RADIOFREQUENCY POWER, MEASUREMENT BY *WAVEMETERS, *MICROWAVE PROBES IN *WAVEGUIDES, ANTENNA HORNS,) (*ELECTROMAGNETIC WAVES, TEST EQUIPMENT, WAVE CHARACTERISTICS, *MICROWAVES, ELECTRIC FIELDS, TRANSMISSION LINES, TESTS, MATHEMATICAL ANALYSIS,)

***WEATHER FORECASTING**

AD-273 307 62-2-5 DIV. 2
LITTLE, ARTHUR D., INC., CAMBRIDGE, MASS.
(*ATMOSPHERIC ELECTRICITY, INSTRUMENTATION, *WEATHER FORECASTING, LIGHTNING, FOG,) (INSTRUMENTATION, LIGHTNING DETECTORS,) (FOG, ELECTRICAL PROPERTIES, CONDUCTIVITY,)

***WEIGHTLESSNESS**

AD-273 098 62-2-5 DIV. 16
AEROSPACE MEDICAL LAB., AERONAUTICAL SYSTEMS DIV., *RIGHT-PATTERSON AIR FORCE BASE, OHIO.
(*WEIGHTLESSNESS, *SPACE MEDICINE, MAN,) (TEST METHODS, AIRBORNE, FLIGHT TESTING, WATER, SIMULATION, ROTATION,) (BEHAVIOR, STRESS (PSYCHOLOGY), SENSORY PERCEPTION, REACTION (PSYCHOLOGY),) (STRESS (PHYSIOLOGY), HEART, EAR, MOTION SICKNESS, MOTOR REACTIONS,)

AD-273 175 62-2-5 DIV. 29
PIONEER-CENTRAL DIV., BENDIX CORP., DAVENPORT, IOWA.
(*OXYGEN EQUIPMENT FOR *WEIGHTLESSNESS IN *SPACE ENVIRONMENTAL CONDITIONS,) (PRESSURE BREATHING, LIQUEFIED GASES, OXYGEN,) DESIGN.

***WELDED JOINTS**

AD-273 091 62-2-5 DIV. 17
TECHNICAL U. OF NORWAY, TRONDHEIM,
(METALS, *ARC WELDING, WELDING FLUXES, SLAGS, SHIELDING, ELECTRIC ARCS) (ARC WELDS, *WELDED JOINTS, *TEMPERATURE MEASUREMENT,) (HEAT TRANSFER, ELECTRIC ARCS THEORY, ANALYSIS, CALORIMETERS, ELECTRIC CURRENTS, ELECTRIC POTENTIAL,) THERMOELECTRICITY, METALLURGICAL ANALYSIS, CRYSTAL STRUCTURE, MICROSTRUCTURE,

AD-273 176 62-2-5 DIV. 20
BATTELLE MEMORIAL INS., COLUMBUS, OHIO.
(CHEMICAL IMPURITIES, CONTAMINATION, CARBON, HYDROGEN, NITROGEN, OXYGEN, *WELDING, *TITANIUM ALLOYS, ALUMINUM ALLOYS CHROMIUM ALLOYS, MOLYBDENUM ALLOYS, VANADIUM ALLOYS, HARDNESS, TENSILE PROPERTIES, MECHANICAL PROPERTIES,) (*WELDS, *WELDED JOINTS, WELDING RODS, GRAINS (METALLURGY),) (ALLOYS, METALS, HEAT TREATMENT, ARC WELDS, SHEETS, TESTS, IMPACT SHOCK, DEFORMATION, MICROSTRUCTURE,)

AD-273 338 62-2-5 DIV. 20
AEROPROJECTS, INC., WEST CHESTER, PA.
(HEAT RESISTANT ALLOYS, REFRACTORY MATERIALS, METALS, ALLOYS, SHEETS, METAL PLATES, *WELDING, ULTRASONICS, ENERGY TRANSDUCERS, *INDUSTRIAL EQUIPMENT,) *WELDED JOINTS, NICKEL-ALLOYS, NIOBIUM ALLOYS (D-91), COBALT ALLOYS, CHROMIUM ALLOYS, MOLYBDENUM ALLOYS, TITANIUM ALLOYS, IRON ALLOYS, STEEL, STAINLESS STEEL, TUNGSTEN.

***WELDING**

AD-273 038 62-2-5 DIV. 17
ARMOUR RESEARCH FOUNDATION, CHICAGO, ILL.
(*TITANIUM ALLOYS, *SHEETS, *WELDING, HEAT TREATMENT, ELECTROMAGNETIC EFFECTS, VIBRATION, AGING,) (ARC WELDING, MAGNETIC WAVES, ABSORPTION, EXCITATION,) (FOURIER ANALYSIS, INTEGRAL TRANSFORMS, PERTURBATION THEORY, PROBABILITY,)

AD-273 176 62-2-5 DIV. 20
BATTELLE MEMORIAL INS., COLUMBUS, OHIO.
(CHEMICAL IMPURITIES, CONTAMINATION, CARBON, HYDROGEN, NITROGEN, OXYGEN, *WELDING, *TITANIUM ALLOYS, ALUMINUM ALLOYS

CHROMIUMALLOYS, MOLYBDENUM ALLOYS, VANADIUM ALLOYS, HARDNESS, TENSILE PROPERTIES, MECHANICAL PROPERTIES.) (*WELDS, *WELDED JOINTS, *WELDING RODS, GRAINS (METALLURGY).) (ALLOYS, METALS, HEAT TREATMENT, ARC WELDS, SHEETS, TESTS, IMPACT SHOCK, DEFORMATION, MICROSTRUCTURE.)

AD-273 338 62-2-5 DIV. 26
AEROPROJECTS, INC., *WEST CHESTER, PA.
(HEAT RESISTANT ALLOYS, REFRACTORY MATERIALS, METALS, ALLOYS, SHEETS, METAL PLATES, *WELDING, *ULTRASONICS, ENERGY TRANSDUCERS, *INDUSTRIAL EQUIPMENT.) *WELDED JOINTS, NICKELALLOYS, NIOBIUM ALLOYS (0-31), COBALT ALLOYS, CHROMIUM ALLOYS, MOLYBDENUM ALLOYS, TITANIUM ALLOYS, IRON ALLOYS, STEEL, STAINLESS STEEL, TUNGSTEN.

***WELDS**

AD-273 176 62-2-5 DIV. 26
BATTELLE MEMORIAL INS., COLUMBUS, OHIO.
(CHEMICAL IMPURITIES, CONTAMINATION, CARBON, HYDROGEN, NITROGEN, OXYGEN, *WELDING, *TITANIUM ALLOYS, ALUMINUM ALLOYS CHROMIUMALLOYS, MOLYBDENUM ALLOYS, VANADIUM ALLOYS, HARDNESS, TENSILE PROPERTIES, MECHANICAL PROPERTIES.) (*WELDS, *WELDED JOINTS, *WELDING RODS, GRAINS (METALLURGY).) (ALLOYS, METALS, HEAT TREATMENT, ARC WELDS, SHEETS, TESTS, IMPACT SHOCK, DEFORMATION, MICROSTRUCTURE.)

***WIND TUNNELS**

AD-273 037 62-2-5 DIV. 9
ARNOLD ENGINEERING DEVELOPMENT CENTER, ARNOLD AIR FORCE STATION, TENN.
(*WIND TUNNELS, DESIGN, GROWTH, ELECTRIC ARCS, MATERIALS.) (*AERODYNAMICS, FLUID FLOW, MEASUREMENT.)

AD-273 435 62-2-5 DIV. 12
BOEING CO., SEATTLE, WASH.
(*ROCKET MOTORS, *EXHAUST GASES, *EXHAUST FLAMES, DETECTION, *WIND TUNNELS, *TESTS, INFRARED RADIATION, SPECTROGRAPHIC ANALYSIS, MEASUREMENT.) (ALTITUDE CHAMBERS, SIMULATION.) (INSTRUMENTATION, RADIOMETERS SPECTROPHOTOMETERS.) (EXPERIMENTAL DATA, TABLES.) (LIQUID ROCKET PROPELLANTS, SOLID ROCKET PROPELLANTS.)

***WINGS**

AD-273 084 62-2-5 DIV. 9
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION, WASHINGTON, D. C.
(*WINGS, SUPERSONICS, TRANSONICS, AERODYNAMICS, OSCILLATION, SUPERSONIC FLIGHT, DEFORMATION, ELASTICITY, *FLUTTER, GUST LOADS, VIBRATION, MATHEMATICAL ANALYSIS, INTEGRAL EQUATIONS, DIFFERENTIAL EQUATIONS, PARTIAL DIFFERENTIAL EQUATIONS.)

***X-RAY SPECTRUM**

AD-273 059 62-2-5 DIV. 25
ORDNANCE TANK-AUTOMOTIVE COMMAND, DETROIT, MICH.
(X RAYS, *RADIOGRAPHIC ANALYSIS, *BREMSSTRAHLUNG, *X-RAY SPECTRUM, ELECTROSTATICS.) (ELECTRONS, SCATTERING AND PHOTONS, ABSORPTION, ENERGY.) (VOLTAGE, BETATRONS, CYCLOTRON TARGETS.) (COMPUTERS, CODING.)

***X RAYS**

AD-273 078 62-2-5 DIV. 2
MAX-PLANCK-INSTITUT FUR AERONOMIE (GERMANY).
(HIGH ALTITUDE, ATMOSPHERE, IONIZATION, *COSMIC RAYS, *AURORAE, *X RAYS, MEASUREMENT, AIRBORNE, INSTRUMENTATION, ELECTRONIC EQUIPMENT, *RADIATION COUNTERS, BALLOONS.) (PULSE COUNTERS, RADIO TRANSMITTERS, POWER SUPPLIES, OSCILLATORS, ELECTRIC FILTERS, RADIO RECEIVERS, ELECTRONIC CIRCUITS, PACKAGING.)

AD-273 079 62-2-5 DIV. 2
MAX-PLANCK-INSTITUT FUR AERONOMIE (GERMANY).
(*X RAYS, *COSMIC RAY BURSTS, INTENSITY, *AURORAE, MAGNETIC EFFECTS, MEASUREMENT.) (BALLOONS, AIRBORNE, GEIGER COUNTERS, IONIZATION CHAMBERS.)

***ZINC**

AD-273 017 62-2-5 DIV. 17
CASE INST. OF TECH., CLEVELAND, OHIO.
(METALS, *ZINC, CRYSTALS, SINGLE CRYSTALS, BRILLOUIN ZONES, *MAGNETIC SUSCEPTIBILITY, MAGNETIC FIELDS, QUANTUM MECHANICS, ATOMIC ENERGY LEVELS, THEORY.) SOLID STATE PHYSICS.

***ZINC ELECTRODES**

AD-273 294 62-2-5 DIV. 4
CENTRAL INST. FOR INDUSTRIAL RESEARCH (NORWAY).
(*COPPER ELECTRODES, *ZINC ELECTRODES, COPPER, ZINC, *ELECTROCHEMISTRY, ELECTRODES, METALS, IONS, *REACTION KINETICS, ACIDS, SOLUTIONS, BROMIDES, CHLORIDES.)

TECHNICAL ABSTRACT BULLETIN

1. AIRCRAFT AND FLIGHT EQUIPMENT

AD-273 050 Div. 1, 9
(TISTA/WAW) OTS price $3.60

Princeton U., N. J.
A SUMMARY OF THE PRINCETON UNIVERSITY - U. S. ARMY ALART PROGRAM.
Final rept., 1 Jan 59-31 Dec 61,
comp. by T. E. Sweeney. Jan 62, 34p. (Rept. no. 566)
(Contract DA 44-177-tc-524)
Unclassified report

DESCRIPTORS: (*Military aircraft, *Military research, *Scientific research, Research program administration.) (*Vertical take-off planes, Short take-off planes, *Flying platforms, Helicopters, Ground effect, Stability, Control, Model tests, Theory, Mathematical analysis.) (Aircraft, Airplanes, Electrical properties, Theory.) (Test facilities, Wind tunnels, Design.) *Bibliography.

A summary with a bibliography of the work done on the Army Low-Speed Aeronautical Research Task (ALART) is presented. The work consisted of the following: (1) Research in the field of dynamic flight characteristics utilizing the Forward Flight Facility (Long Track); (2) Research dealing with problems of ground effect machines; (3) Theoretical research dealing with the fundamental problems of flying jeeps and flying platforms; (4) Research dealing with the handling qualities and dynamic stability of helicopters and V/STOL type aircraft; (5) An analytical program determining the feasibility and significance of a flying VTOL simulator; (6) An essentially theoretical program with some experimental correlation looking into the fundamental causes of static electricity build-up in aircraft; (7) A study of the feasibility and desirability of a static test facility (special wind tunnel) designed particularly to handle the high downwash angle problem; and (8) An essentially theoretical study with experimental correlation to determine the applicability of adaptive control and stability to ground effect machines.

AD-273 071 Div. 1, 2, 14
(TISTN/GEC) OTS price $5.60

Kaysam Corp. of America, Paterson, N. J.
STUDY OF PHYSICAL AND CHEMICAL CHARACTERISTICS OF BALLOONS AND BALLOON MATERIALS.
Quarterly progress rept. no. 7, 25 Oct 61-24 Jan 62,
by Eric Nelson and Herman Newstein. 24 Jan 62, 54p. incl. illus. tables.
(Contract DA 36-039-sc-84925, Proj. 3D36-21-001-04)
Unclassified report

DESCRIPTORS: (*Balloons, *Meteorological balloons, Materials, *Buoyant materials, Films, Configuration, Aerodynamic configurations, Radiation effects.) (Polymers, Synthetic rubber, Plasticizers, Catalysts, Reinforcing materials.) (Tests, Physical properties, Mechanical properties, Tensile properties, Elasticity, Ultraviolet radiation, Ozone.) (Flight testing, High altitude.)

Neoprene 673 was evaluated as a possible balloon film. The study of aged neoprene latex was continued. Increasing the accelerator quantity in dual-purpose compounds did not improve elongation at -70 C, but use of Wingstay T increased elongation from 500 to 600% at this temperature. Balloons weighing 2500 gram and made from compound A3-101 performed well at 130,000 ft. Those made from the dual-purpose compound A3-138 performed well at 80,000 and 100,000 ft. levels. One-piece, spherical, fast-rise balloons made from A3-134 were moderately successful. Studies of UV radiation effects and the bursting mechanism were made. Flight characteristics of 2-piece, streamlined balloons, and larger balloons with longer tail sections were studied with respect to altitudes and rates of ascent.

AD-273 086 Div. 1
(TISTA/WAW) OTS price $.50

National Aeronautics and Space Administration, Washington, D. C.
EFFECTS OF COUPLING BETWEEN PITCH AND ROLL CONTROL INPUTS ON THE HANDLING QUALITIES OF VTOL AIRCRAFT,
by John F. Garren, Jr. Mar 62, 10p. incl. illus. tables, 4 refs. (Technical note D-1233)
Unclassified report

Also available from NASA, Wash. 25, D. C., as NASA Technical note D-1233.

DESCRIPTORS: (*Vertical take-off planes, Helicopters, Control, Pitch, Roll, Errors, Flight testing.)

Various VTOL aircraft configurations which have exhibited coupling between pitch and roll inputs, requiring a combination of longitudinal and lateral motions of the stick to obtain a pure pitch or a pure roll response, have often given rise to adverse pilot comment. To provide a basis for establishing handling qualities criteria with respect to cross controlling, both instrument and visual flight tests were conducted in which the pilot was required to cross control (use a combination of longitudinal and lateral

stick motion) to achieve a pure response. The results of these tests indicate that for control phase angles (the angle through which the pilot must cross control to obtain a pure response) of up to 20 degrees, the pilot is aware of coupling only when making large corrections or inputs. However, it was found that control phase angles greater than 35 degrees resulted in unsatisfactory handling qualities for an aircraft with otherwise satisfactory to optimum characteristics. (Author)

AD-273 144 Div. 1, 5, 6, 19
(TISTE/NTM) OTS price $6.60

National Aviation Facilities Experimental Center, Atlantic City, N. J.
A DESCRIPTION OF SYSTEMS, THEORIES AND PROJECTS AT NAFEC.
Annual rept.
1961, 58p. incl. illus.
(ESD TDR 62-17) Unclassified report

DESCRIPTORS: *Airplane landings, *Voice communication systems, *Air traffic control systems, *Automatic navigators, *Flight simulators, Height finding, Direction finding, Detection, Display systems, Glide path systems, Approach lights, Runways, Ground speed indicators, Radio communication systems, Parametric amplifiers, *Data processing systems, Display systems, Radar equipment, Doppler systems, Antennas, Direction finding, *Safety, Simulation, Theory, Ground controlled approach radar.

Contents:
Approach and landing systems
Communications
Data acquisition and processing
Navigation
Research activities
Simulation
Aircraft safety
Weather

AD-273 209 Div. 1
(TISTA/WAW) OTS price $21.00

Chance Vought Corp., Dallas, Tex.
MODULAR HYDRAULIC SYSTEM DEVELOPMENT. PROJECT HYDRATOY. PART I.
Final engineering rept. on Modular Hydraulics, by G. Gilder. 31 Aug 61, 359p. incl. illus. tables (Rept. no. AER-E1R-13120, pt. 1)
(Contract NOa(s) 59-6019-c)
Unclassified report

DESCRIPTORS: (*Jet planes, *Rocket planes, *Hypervelocity vehicles, Naval aircraft, Controlsystems, Servo systems, Hydraulic servomechanisms, *Hydraulic systems, Design, Packaging, High temperature research, Installation.) (Hydraulic valves, Hydraulic seals, Metal seals, Design, Materials, Packaging, Tests, Test methods.)

The program's basic objectives are to: (1) Package groups of individual components into one housing to save weight and space and gain reliability. (2) Make the use of packages more attractive and to simplify installation and maintenance by providing a standard line of self-contained cartridge-like components for use in these packages. (3) Carry this integration one step further and investigate ways and means of physically integrating the complete hydraulic system into its supporting structure. (4) Develop the above concepts for a 450 F, 4,000 psi hydraulic system using corrosion-resistant materials and metallic seals. The report is published in 4 separately bound parts. Part I contains results of metallic seal and package development. (Author)

AD-273 210 Div. 1
(TISTA/WAW) OTS price $21.00

Chance Vought Corp., Dallas, Tex.
MODULAR HYDRAULIC SYSTEM DEVELOPMENT. PROJECT HYDRATOY. PART II.
Final engineering rept. on Modular Hydraulics, by G. Gilder. 31 Aug 61, 1v. incl. illus. tables (Rept. no. AER-E1R-13120, pt. 2)
(Contract NOa(s)59-6019-c)
Unclassified report

DESCRIPTORS: (*Jet planes, *Rocket planes, *Hypervelocity vehicles, Naval aircraft, Control systems, Servo systems, Hydraulic servomechanisms, *Hydraulic systems, Design, Packaging, High temperature research, Installation.) (Hydraulic valves, Pressure switches, Hydraulic fluid filters, Design, Specifications, Standards, Test methods, Quality control.)

This report is published in 4 separately bound parts. Part II presents results of modular component development and the specifications and standards for those components. (Author)

AD-273 211 Div. 1
(TISTA/WAW) OTS price $18.00

Chance Vought Corp., Dallas, Tex.
MODULAR HYDRAULIC SYSTEM DEVELOPMENT. PROJECT HYDRATOY. PART III.
Final engineering rept. on Modular Hydraulics, by G. Gilder. 31 Aug 61, 268p. incl. illus. tables (Rept. no. AER-E1R-13120, pt. 3)
(Contract NOa(s)59-6019-c)
Unclassified report

DESCRIPTORS: (*Jet planes, *Rocket planes, *Hypervelocity vehicles, Naval aircraft, Control systems, Servo systems, Hydraulic servomechanisms, *Hydraulic systems, Design, Packaging, High temperature research, Installation, Materials, Costs, Reliability.) (Hydraulic couplings, Hydraulic conduits, Design, Tests, Manufacturing methods.)

The report is published in 4 separately bound parts. Part III contains results of development in the integrated system concept and design criteria for the modular hydraulic concept. (Author)

AD-273 212 Div. 1
(TISTA/WAW) OTS price $13.50

Chance Vought Corp., Dallas, Tex.
MODULAR HYDRAULIC SYSTEM DEVELOPMENT. PROJECT HYDRATOY. PART IV.
Final engineering rept. on Modular Hydraulics, by G. Gilder. 31 Aug 61, 189p. incl. illus. tables, 72 refs. (Rept. no. AER-E1R-13120, pt. 4)
(Contract NOa(s)59-6019-c)
Unclassified report

DESCRIPTORS: (*Jet planes, *Rocket planes, *Hypervelocity vehicles, Naval aircraft, *Hydraulic systems, Control systems, Servo systems, Hydraulic servomechanisms, Design, Packaging, High temperature research, Installation.) (Metal seals, Hydraulic seals, Hydraulic valves, Hydraulic conduits, Hydraulic actuators, Materials, Manufacturing methods, Tests, Reliability.) (Metals, Stainless steel, Physical properties.)

This report is published in 4 separately bound parts. Part IV is a report of materials and process development which occurred in conjunction with and as a result of development effort in metallic seals, packages, components, and system integration. (Author)

AD-273 282 Div. 1
(TISTA/WAW) OTS price $1.50

Directorate of Engineering Test, Aeronautical Systems Div., Wright-Patterson Air Force Base, Ohio.
FLIGHT VIBRATION SURVEY OF F-102A AIRCRAFT,
by Phyllis G. Bolds. Jan 62, 39p. incl. illus. tables.
(Proj. 1309)
(ASD TDR 62-37) Unclassified report

DESCRIPTORS: (*Jet fighters, Jet planes, Airframes, *Vibration, Flight testing, Measurement.) (Aircraft equipment, Electronic equipment, Design.)

An F-102A aircraft was surveyed at Wright-Patterson Air Force Base, Ohio, to determine the vibration existing throughout the vehicle under all flight conditions expected in service. Approximately 14,120 data points were evaluated to determine the adequacy of vibration testing requirements of the F-102A type aircraft. The data obtained will be used to formulate more realistic vibration test requirements for items of equipment to be used on F-102A type aircraft. The data indicated that, in general, the vibration testing requirements listed in Specification Mil-E-5272C Procedure VII are more than adequate for F-102A equipment except in the low frequency range (5 to 26 cps). (Author)

AD-273 305 Div. 1
(TISTA/WAW) OTS price $5.00

Lockheed Aircraft Corp., Marietta, Ga.
METHODS FOR ANALYZING FLIGHT VEHICLES DURING THE TAXI CONDITION.
Rept. for June 60-June 61 on Structural Design Criteria,
by J. G. Theisen. Jan 62, 318p. incl. illus. tables, 37 refs. (Rept. no. ER 5179)
(Contract AF 33(616)7546, Proj. 1367)
(ASD TR 61-177) Unclassified report

DESCRIPTORS: (*Airplanes, *Hypervelocity vehicles, Runways, Landing gear, Take-off, Airplane landings, Load distribution, Mathematical analysis, Statistical analysis, Integral equations, Differential equations.) (Digital computers, Analog computers, Programming.) Dynamics, Damping.

Methods are developed for the prediction of ground taxiing loads for advanced flight vehicles. The theory presented is generally applicable to determining the taxiing response of vehicles operated on prepared or unprepared terrain with randomly distributed surface undulations. The vehicle, with many degrees of flexibility and nonlinearities of the shock strut, is represented in a generalized LaGrangian coordinate system. Nonlinear solutions are obtained in closed analytical form, and on analog and digital computers, to various degrees of approximation for taxiing over an existing runway profile. Equivalent linearized transfer functions are developed for comparison on the basis of power and cross spectral densities, load occurrences, and probabilities for a variety of speeds and nonlinear parameters. Test data are used to substantiate theoretical results where applicable. (Author)

AD-273 446 Div. 1, 28, 30
(TISTA/WAW) OTS price $3.60

Martin Co., Baltimore, Md.
AIR FORCE FLIGHT CONTROL AND FLIGHT DISPLAY INTEGRATION PROGRAM.
Final summary rept. on Human Engineering Support to the Air Force Flight Control and Flight Display Integration Program,
by R. W. Obermayer and W. R. Green. Dec 61, 29p. (Engineering rept. no. 12190)
(Contract AF 33(616)7752)
Unclassified report

DESCRIPTORS: (*Flight instruments, Control panels, Instrument panels, Instrument dials, *Display systems, Numbers, Coding, Design, Effectiveness, Pilots, Reading, Human engineering, Statistical tests.) (Statistical analysis, Sampling, Public opinion polls.) All-weather aviation, Instrument landings.

2. ASTRONOMY, GEOPHYSICS AND GEOGRAPHY

AD-273 000 Div. 2
(TISTP/GRW) OTS price $3.60

Texas A. and M. Coll., College Station.
THE SAVONIUS ROTOR CURRENT METER,
by Roy D. Gaul. 1 Feb 62, 54p. incl. illus. tables, 12 refs. (Ref. no. 62-2T)
(Contract Nonr-211904, Proj. NR 083-036)
Unclassified report

DESCRIPTORS: (Velocity, Direction finding of *Ocean currents, Measurement, Florida, *Recording devices.) (Meters, Design, Construction, Experimental data.)

Several varieties of air-sea transducers were installed during 1961 at Stage I off Panama City, Florida. One of these, the Savonius rotor current meter, is of particular interest. This analysis summarizes the experimental work done on the Savonius rotor both prior to and as a part of the Panama City project. In a section on the application of the rotors for environmental studies off Panama City, experiments with the particular meters are discussed in detail. Some attention is also given to the over-all mechanical and electrical design of the meter. (Author)

Division 2 - ASTRONOMY, GEOPHYSICS AND GEOGRAPHY

AD-273 021 Div. 2, 8
(TISTP/GRW) OTS price $8.10

Saskatchewan U. (Canada).
METEOR SIGNAL STUDIES.
Final rept.,
by P. A. Forsyth and D. W. Rice. 30 Sep 61,
1v. incl. illus. table, 17 refs. (Radio studies rept. no. RS-9)
(Contract AF 19(604)7329)
(AFCRL-921) Unclassified report

DESCRIPTORS: (Radio signals, *Ionospheric propagation, *Meteors, Wake, Detection, *Radar echo areas, Reflection, Ultra high frequency.)

Meteors can be used effectively as probes for investigating various aspects of the disturbed and undisturbed ionosphere. Combinations of VHF forward-scatter and back-scatter circuits were examined to assess their utility in measurements of the ambipolar diffusion coefficient by means of meteor signal decay rates. Experimental work using other circuit combinations indicates that the most useful arrangement is a forward-scatter circuit used in conjunction with a UHF radar. Observations of the decay rates of forward-scattered signals indicate the presence of the same large dispersion that was reported for back-scatter measurements. A qualitative mechanism, based upon an irregularly ionized meteor trail, appears adequate to account for the dispersion. (Author)

AD-273 053 Div. 2
(TISTP/GRW) OTS price $12.50

Wisconsin U., Madison.
STUDIES OF THE THREE-DIMENSIONAL STRUCTURE OF THE PLANETARY BOUNDARY LAYER.
Annual rept. no. 1, 1 July 59-30 June 61,
by Heinz H. Lettau, Robert H. Burgy and others.
Aug 61, 176p. incl. illus. tables, 7 refs.
(Contract DA 36-039-sc-80282)
Unclassified report

DESCRIPTORS: (*Micrometeorology, Terrain, Turbulent boundary layer, Atmosphere, Heat transfer.) (Earth, Surface properties, Climatic factors, Soils.)

The three-dimensional structure of the planetary boundary layer was investigated. Investigations of four types are reported: (1) A comparison of experimental determinations with a theoretical model for the effects of solar heating at the earth's surface, (2) experimental determinations of the effect of surface roughness on the dynamics of the air near the earth's surface, (3) a new theoretical model for the length-scale of turbulence for duct flow and atmospheric boundary layer flow, and (4) a theoretical analysis of the steady-state, neutral wind profile for the entire planetary boundary layer.

AD-273 076 Div. 2, 4
(TISTN/EJH) OTS price $13.00

Massachusetts Inst. of Tech., Cambridge.
CHEMICAL AND PHYSICAL STUDIES OF TEKTITES.
Final rept.,
by W. H. Pinson, Jr. 15 Feb 62, 169p. incl. illus. refs.
(Contract AF 19(604)6135, Proj. 7698; Continuation of Contract AF 19(604)5497)
(AFCRL 62-221) Unclassified report

DESCRIPTORS: (Meteorites, *Minerals, *Geochemistry, *Isotopes, Radioactive isotopes, *Strontium, *Rubidium, Australia, Indochina, Indonesia, Philippine Islands, North America, Czechoslovakia.) Chemical analysis, Mass spectroscopy, X-ray spectroscopy, Fluorescence.

Reanalyses of tektites revealed that they contain measurable quantities of radiogenic Sr. The Rb, Sr and Sr isotopic compositions were determined in tektites from Indochina, the Philippine Islands, Australia, Java, North America, and Czechoslovakia. The average Sr-87/Sr-86 ratio in 16 tektites is 0.7183 ± 0.0004 from the above localities, exclusive of Czechoslovakia (moldavites). The Rb and Sr contents from a given locality were similar, but differences existed between localities. Analyses revealed what appeared to be a sympathetic variability between Sr-87/Sr-86 ratios and Rb/Sr ratios among several groups of tektites which could be explained by a common age (approximately 175 million years). A separate study of the major element compositions of tektites was made; 34 new major element analyses for southeast Pacific areas are presented; chemical similarities are noteworthy. The Rb-Sr data and major element data indicate an extra-terrestrial origin for tektites.

AD-273 078 Div. 2, 30, 8, 5
(TISTA/WAW) OTS price $1.60

Max-Planck-Institut fur Aeronomie (Germany).
A BALLOON BORNE APPARATUS FOR MEASUREMENTS OF IONIZING RADIATION IN HIGH ALTITUDES,
by H. Erbe. 30 Sep 61, 10p. incl. illus. 12 refs. (Technical note no. 1)
(Contract AF 61(052)372)
(AFOSR-1729) Unclassified report

DESCRIPTORS: (High altitude, Atmosphere, Ionization, *Cosmic rays, *Aurorae, *X rays, Measurement, Airborne, Instrumentation, Electronic equipment, *Radiation counters, Balloons.) (Pulse counters, Radio transmitters, Power supplies, Oscillators, Electric filters, Radio receivers, Electronic circuits, Packaging.)

After introductory remarks on the need for soft radiation measurements, a suitable sounding apparatus and the main features of the receiving equipment are discussed. (Author)

AD-273 079 Div. 2
(TISTP/GRW) OTS price $2.60

Max-Planck-Institut fur Aeronomie (Germany).
A CONTRIBUTION TO THE MORPHOLOGY OF X-RAY BURSTS IN THE AURORAL ZONE,
by G. Pfotzer, A. Ehmert and others. 30 Sep 61, 17p. incl. illus. tables, refs. (Technical note no. 2)
(Contract AF 61(052)372)
(AFOSR-1730) Unclassified report

DESCRIPTORS: (*X rays, *Cosmic ray bursts, Intensity, *Aurorae, Magnetic effects, Measurement.) (Balloons, Airborne, Geiger counters, Ionization chambers.)

Between September 16th and October 5th, 1960, eight Skyhook-flights with combinations of thin-walled Geiger-counters and ionization chambers were performed in the auroral zone at Kiruna, Northern Sweden. X-ray bursts were recorded on September 27th, October 1st, and 2nd. The correlation between all bursts and cosmic noise absorption (CNA) was close. Clear correspond-

ences between the onsets of the bursts and of the magnetic disturbances but only weak correlations in the later phases were observed. The events on October 1st and 2nd were probably caused by the same extraterrestrial generative source, possibly a beam of ionized solar gas, persisting during two rotations of the sun. (Author)

AD-273 099 Div. 2, 25, 6, 12
(TISTW/RD) OTS price $14.50

Boeing Co., Seattle, Wash.
INFRARED SATELLITE BACKGROUNDS. PART I. ATMOSPHERIC RADIATIVE PROCESSES.
Final rept., pt. 1,
by Richard K. McDonald, John Bell and others.
30 Sep 61, 200p. incl. illus. tables, 261 refs.
(Document no. D2-90054, pt. 1)
(Contract AF 19(604)7457)
(AFCRL-1069, pt. 1) Unclassified report

DESCRIPTORS: (*Infrared radiation from Atmosphere as Background for *Satellite vehicles.) (Reflection, Scattering of Infrared radiation from Air, Clouds, Sun, Earth.) (Carbon dioxide, Ozone, Water vapor, Ice, Cirrus clouds.) (Aerosols in Stratosphere.) (Atmosphere, Molecules, Absorption.)

Experimental and theoretical data on atmospheric radiation processes are reviewed and an estimate made of IR (2 to 5 microns) background effects observable to a satellite. New models were developed for atmospheric water content probabilities, cirrus cloud distribution, and cirrus IR scattering properties. The study is limited to atmospheric phenomena above 10 km in the 50 to 70 degrees latitude belt. Attention is called to the occurrence of artificial backgrounds, abnormal dust clouds, and banded clouds in the stratosphere. (Author)

AD-273 114 Div. 2, 30
(TISTP/WH) OTS price $26.00

Massachusetts Inst. of Tech., Cambridge.
TIME SERIES TECHNIQUES APPLIED TO UNDERGROUND NUCLEAR DETECTION AND FURTHER DIGITIZED SEISMIC DATA,
by S. M. Simpson, Jr. 30 Dec 61, 502p. incl. illus. tables (Scientific rept. no. 2)
(Contract AF 19(604)7378, Proj. 8652)
(AFCRL-62-262) Unclassified report

DESCRIPTORS: (*Seismic waves, *Seismographs, Spectrographic analysis.) (Magnetic tapes, Seismographs, *Digital systems.) (Underground explosions, Detection.)

Forty more records from the Logan and Blanca series have been digitized at 1/20 sec. increments, approximately 3000 points each, making a total of 94 records (including 34 earthquakes at 1/10 sec.) which are presently available to others on IBM BCD magnetic tapes. Spectral analysis underlies most of our applied concepts. A mathematical treatment of the spectral estimation problem for stationary time series is presented, including an analysis of bias, variance, and end effects for an optimum (Daniell) estimation technique. Numerical and programming analysis of correlations and cosine, sine transforms required to instrument the Daniell technique have resulted in high-speed general purpose subroutines. Work with linear operators pertinent to the detection problem was pursued. A linear operator study designed to compress the first few motions of the seismogram to a spike was begun. The linear operator representing the impulse response of the short-period Benioff has been determined by transforming a pole-zero representation of the instrument transfer function. (Author)

AD-273 143 Div. 2, 30
(TISTP/GRW) OTS price $9.10

Laboratory of Astrophysics and Physical Meteorology, Johns Hopkins U., Baltimore, Md.
ASTRONOMICAL OBSERVATIONS USING THE ONR STRATO-LAB.
Technical rept.,
by John Strong. 1961, 9p. illus.
(Contract Nonr-24852)
Unclassified report

Original contains color plates; all ASTIA reproductions will be in black and white. Original may be seen in ASTIA Hq.

DESCRIPTORS: (*Astronomical observatories in Stratosphere by High altitude, Balloons, Instrumentation.) (Physical properties of *Planetary atmospheres, Determination, Recording devices, Experimental data.)

This report includes:
Little, Arthur D., Inc., Cambridge, Mass.
VISUAL OBSERVATIONS DURING THE FLIGHT, by C. B. Moore. 1961, 5p. incl. illus.

Johns Hopkins U., Baltimore, Md.
SPECTROMETER INSTRUMENTATION, by J.M.Burn, Jr. 1961, 9p. incl. illus.
Librascope Div., General Precision, Inc., Glendale, Calif.
LIBRASCOPE STARTRACKER DESCRIPTION, by M. M. Birnbaum and W. J. Wichman. 1961, 10p. illus.

This analysis is concerned with the expansion of astronomy made possible by the availability of balloons and high-altitude aircraft to carry astronomical observing instruments above the curtaining infrared absorption of the earth's atmosphere. (Author)

AD-273 154 Div. 2
(TISTP/GRW) OTS price $1.10

Northwestern U., Evanston, Ill.
RESEARCH ON STELLAR IMAGE MOTION AND SCINTILLATION.
Final interim rept., 1 Sep 60-31 Aug 61,
by Raymond K. Woo and William C. White.
18 Jan 62, 3p.
(Contract AF 49(638)941)
(AFOSR-2075) Unclassified report

DESCRIPTORS: (*Stars, *Motion, Measurement, Recording devices.)

AD-273 182 Div. 2
(TISTP/GRW) OTS price $3.60

Cologne U. (Germany).
RESEARCH ON THE SYNOPTICAL MEASUREMENTS OF THE VERTICAL OZONE DISTRIBUTION,
by H. K. Paetzold. 1 Dec 61, 19p. illus.
12 refs. (Technical note no. 1)
(Contract AF 61(052)330)
(AFCRL 62-290) Unclassified report

DESCRIPTORS: (*Ozone, Distribution, Measurement, *Atmospheric sounding, Balloons.) (Experimental data, Data processing systems.)

The optical ozone sonde of the Paetzold-Kulcke-type was improved to reduce the weight of, and simplify handling of ozone balloon soundings. The errors of ozone measurements were diminished. An electronic computer program was developed for the evaluation of the sounding data. It provides a homogeneous and objective procedure which permits the ozone profile to be made soon after ascent. Ten successful flights were completed with this new version of the optical sonde.

AD-273 183 Div. 2
(TISTP/GRW) OTS price $2.60

DECO Electronics, Inc., Boulder, Colo.
SOME ELECTRICAL PROPERTIES OF THE EARTH'S CRUST,
by A. D. Watt, E. L. Maxwell, and F. S. Mathews.
7 Mar 62, 24p. incl. illus. 14 refs. (Rept. no. 30-S-1)
(Contract Nonr-338700, NR 371-590)
Unclassified report

Presented at the Raton Navy Research and Development Clinic, Raton, New Mexico, September 1961.

DESCRIPTORS: (*Earth, Boundary layer, Atmosphere, Terrain, *Electrical properties.) (Terrestrial magnetism, Electrical conductance.)

AD-273 186 Div. 2
(TISTP/FR) OTS price $9.10

1st Weather Wing, Air Force.
TERMINAL FORECAST MANUAL. DET. 5, CLARK A.B., PHILIPPINES.
1961, 94p. incl. illus. tables, 12 refs.
Unclassified report

DESCRIPTORS: (*Climate and Meteorological data of the *Philippine Islands for Air force operations at Clark AFB.) (Climate of Japan, Korea, China, Manchuria, Taiwan and the Pacific Ocean.)

This terminal forecast manual is designed to acquaint newly assigned personnel with a general descriptive review of the synoptic weather regimes influencing the weather of the northern Philippine Islands, a more detailed review of the weather conditions affecting Clark Air Base, and a climatic review of significant weather features. Statistical data from the climatological A & B summaries should be used to supplement this description. A section describing the influence of tropical disturbances upon the weather of the Philippine Islands and one on weather in the Far East are included. References, which provide a more detailed description of many of the weather disturbances, are listed. (Author)

AD-273 187 Div. 2
(TISTP/FR) OTS price $6.60

Aeronautical Chart and Information Center, St. Louis, Mo.
GEODESY FOR THE LAYMAN.
Oct 59, rev. Jan 62, 64p. incl. illus. 8 refs.
(Revision of AD-228 215)
Unclassified report

Original contains color plates; all ASTIA reproductions will be in black and white. Original may be seen in ASTIA Hq.

DESCRIPTORS: *Geodesics.

The basic principles of geodesy and geodetic surveying are presented in elementary form. The formation of geodetic datums is introduced and the necessity of connecting or joining datums is discussed. Methods used to connect independent geodetic systems to a single world reference system are discussed. Emphasis is placed on the contribution of the Air Force in developing a World Geodetic System. (Author)

AD-273 234 Div. 2, 25, 15
(TISTP/MFA) OTS price $11.00

Hamburg U. (Germany).
PROBLEMS OF GRAVITATION. CONTAINING TWO PARTS: EMPIRICAL ASPECTS OF DIRAC'S HYPOTHESIS. PROGRESS IN THE MATHEMATICAL PROBLEMS OF EINSTEIN'S THEORY OF GRAVITATION.
Final rept. no. 2,
by Pascual Jordan. 1961, 146p. incl. illus. 18 refs.
(Contract AF 61(052)147)
(ARL-228, pt. 2) Unclassified report

DESCRIPTORS: (*Gravity of the *Earth.) (Geology, Physics, Oceanography, Astronomy.) (*Relativity theory, Quantum mechanics, Transformations (Mathematics), Perturbation theory.)

Problems of gravitation are presented. In the first part empirical results of several branches of natural sciences are discussed, in relation to a fundamental problem of gravitation. But in the second part mathematical developments are reported, belonging to the consequences deduced from Einstein's theory of gravitation and general relativity. (Author)

AD-273 258 Div. 2,
(TISTP/MFA) OTS price $4.60

Naval Ordnance Test Station, China Lake, Calif.
SUMMARY OF SHALLOW WATER ENVIRONMENTAL DATA PERTINENT TO ASW OPERATIONS IN LIMITED WAR,
by Irene M. Dickson. Feb 62, 44p. incl. illus. table, 9 refs. (NOTS TP 2852)
(NAVWEPS rept. no. 7832)
Unclassified report

DESCRIPTORS: (*Oceanography and Ocean bottom, Analysis of *Beaches along South China Sea, Egypt, Taiwan, Korea, Iran, Arabia, Finland and USSR.) (*Geography, History, Geology and Meteorology.) (Meteorological data, *Oceanographical data and *Sedimentation.) Antisubmarine warfare.

Oceanographic and meteorological conditions are important to the performance of ASW ordnance and equipment. Data from a few of the shallow water areas of the world have been compiled to give some indication of the range and variation of conditions to be found. There is little or no data on the acoustic reflection and absorption of bottoms--a factor which is particularly important in shallow water propagation. It is hoped that future surveys will include such acoustic measurements. (Author)

AD-273 302 Div. 2
(TISTP/FR) OTS price $13.00

Johannes Gutenberg-Universitaet (Germany).
DETERMINATION OF HEAT BALANCE AT THE BOUNDARY LAYER OVER THE SEA.
Final rept.,
by Gerhard Manier and Fritz Moller. Dec 61, 183p. incl. illus. tables, 37 refs.
(Contract AF 61(052)315)
(AFCRL 62-289) Unclassified report

DESCRIPTORS: (Statistical analysis of *Heat transfer from *Oceans to *Air.) (Meteorological data from Weather stations on Ships in Atlantic Ocean.)

Formulas and graphs are given by which the turbulent sensible and latent heat transfer from water surface to the air can be determined from the measurements of the weather ships. From the observational data of seven North Atlantic weather ships, the heat fluxes have been calculated for four seasons and as functions of wind speed and direction. The values are much larger than the heat fluxes derived by other authors. (Author)

AD-273 303 Div. 2
(TISTP/WH) OTS price $21.00

Air Force Cambridge Research Labs., Bedford, Mass.
HOURLY RAWINSONDES FOR A WEEK,
by Arnold Court and Henry A. Salmela. July 61, 350p. incl. illus. tables, refs. (GRD Research notes no. 60; AFCRL-638)
(Proj. 8624)
Unclassified report

DESCRIPTORS: (*Radiosondes, Balloons, *Meteorological data, Tables, Drift.)

Results of 161 GMD-1 rawinsonde flights made at 1-hour intervals during the first seven days of April 1960, at Bedford, Mass., are presented in detail. Wind displacements over intervals of 1, 2, 3, and 4 minutes are given separately for the west-east and south-north components. Heights and temperatures are presented for standard pressure surfaces every 50 mb to 200 mb and at closer intervals at higher levels. (Author)

AD-273 307 Div. 2
(TISTP/WH) OTS price $8.10

Little, Arthur D., Inc., Cambridge, Mass.
SOME ATMOSPHERIC ELECTRIC INSTRUMENTS FOR USE IN AIR FORCE OPERATIONS.
Final rept.,
by C. B. Moore, P. R. Leavitt and others. 31 Jan 62, 81p. incl. illus. tables, refs.
(Contract AF 19(604)7413)
(AFCRL 62-233) Unclassified report

DESCRIPTORS: (*Atmospheric electricity, Instrumentation, *Weather forecasting, Lightning, Fog.) (Instrumentation, Lightning, Detectors.) (Fog, Electrical properties, Conductivity.)

Lightning Hazards: Knowledge of the origin and properties of lightning is reviewed. Requirements are stated for a lightning warning device operating from the electrostatic component of the potential gradient change. Successful lightning counters are examined followed by a design of a recommended lightning detector for Air Force use. Also reported is the development of a corona current detector for use in warning of the onset of electrification in nearby clouds. Fog Forecasting: A method for forecasting onset of fogs using conductivity decreases is reviewed. The success of the method is attributed to the detection of the growth of fog particles before they become an obstruction to visibility. Accordingly, a device was constructed to detect concentrations of atmospheric particles in the range of sizes between nuclei and fog particles. The design characteristics of this device are given. The results of observations at Bedford Airport with apparatus for measuring the electrical conductivity, aerosol concentration, and the visibility are reported. (Author)

AD-273 310 Div. 2, 19
(TISTW/RD) OTS price $3.60

Geophysics Corp. of America, Bedford, Mass.
LUNAR PHOTOMETRY FOR NAVIGATION,
by R. J. Levy. Feb 62, 32p. incl. illus. tables, 32 refs. (GCA Technical rept. no. 62-10-A)
(Contract AF 33(616)7413)
Unclassified report

DESCRIPTORS: (*Moon, Surface properties, Brightness, Light, Navigation, *Space navigation.) (Measurement of Brightness of Moon with Photometers.) Astronomy.

Available information on aspects of the moon's photometric behavior is reviewed and discussed as it applies to anticipated navigational measurements. The variations with changing phase of total moonlight, surface brightness of specific areas, the limb, and the earthlit portions are considered. Other topics include the spectral energy distribution of moonlight, the size and shape of the moon, and the risk of error in determining direction of the moon's center from measurements on its irregular limb. (Author)

AD-273 327 Div. 2, 20
(TISTP/FR) OTS price $2.60

Sandia Lab., Albuquerque, N. Mex.
MICROBAROGRAPH MEASUREMENTS.
Preliminary rept. on Vela Uniform Plowshare Program, Project Gnome,
by J. W. Reed and H. W. Church. Jan 62, 20p. incl. illus. tables, 8 refs. (Rept. no. VUP-2001)
(Proj. 1.8) Unclassified report

DESCRIPTORS: (*Underground explosions, *Nuclear explosions, *Microbarometric waves, Measurement, Meteorology.) Microbarometers.

Air-pressure signals from the underground Gnome detonation were investigated with on-site pressure gages and off-site microbarographs. Unusual weather and an insufficient number of measurement stations resulted in no off-site recordings. Useful data were obtained on site to further aid in source descriptions from underground blasts. (Author)

Division 3-CHEMICAL WARFARE EQUIPMENT AND MATERIALS

AD-273 433 Div. 2, 15
(TISTP/TL) OTS price $1.10

American Meteorological Society, Boston, Mass.
SOME ANOMALIES IN THE STUDY OF IONOSPHERIC DRIFTS (O Nekotorykh Anomaliiakh pri Issledovanii Ionosfernykh),
by V. D. Gusev and S. F. Mirkotan, tr by Burton Hobson. Apr 61, 10p. incl. illus. 6 refs. (Trans. no. T-R-376 of Issledovaniia Ionosfery no. 3, pp. 77-82, 1960, Izdatel'stvo Akademii Nauk SSSR, 1960)
(Contract AF 19(604)6113)
Unclassified report

DESCRIPTORS: (*Ionospheric disturbances, *Electromagnetic fields, Reflection, *Drift, Wind.) (Statistical processes, *Statistical functions.) USSR.

The ionosphere is irregular in its usual state: it consists of ionized formations-irregularities. There is a wide range in the dimensions of these formations; they drift regularly, change randomly and disperse. This report concerns several anomalous features in the behavior of an irregular ionosphere which make it possible to hypothesize the dynamics of the latter and to concentrate on the important aspects of the investigative method. This work is based on the study of large ionospheric irregularities made during the IGY program for the period January, 1957 - January, 1958. (Author)

3. CHEMICAL WARFARE EQUIPMENT AND MATERIALS

AD-273 039 Div. 3
(TISTB/CCH) OTS price $3.60

Army Chemical Research and Development Labs., Army Chemical Center, Md.
FINAL ENGINEERING TEST OF E15R2 IMPREGNITE-IN-CLOTHING TESTING KIT.
Final engineering test no 164,
by John F. Mahony and William C. Johnson. Oct 61, 34p. incl. illus. tables (Rept. no. CRDLR-3095)
Unclassified report

DESCRIPTORS: (*Protective clothing, Impregnation, *Decontamination kits, Design.) (Test methods, Decontamination, Temperature.)

This test program was to determine the ability of the E15R2 Impregnite testing kit to meet approved military characteristics as a field kit for testing the XXCC3 content of permeable protective clothing. The kit withstood all rough-handling tests with only minimal damage. Dye solutions (3% and 1.5%) after modifications were sufficiently sensitive to provide a good test for determining the XXCC3 content of permeable protective clothing. The test procedure is simple and takes less than 5 minutes. The kits, after modification, withstood 9 weeks of accelerated surveillance without decrease in sensitivity. Functional tests at temperature extremes indicated that the kits are not suitable for use below 35 F, because of reduced rate of reaction at lower temperatures. Tests also revealed that some substances affected the reaction, but in all cases the breakoff point occurred above the minimum allowable amount of impregnation. (Author)

AD-273 042 Div. 3
(TISTW/EET) OTS price $3.60

Diamond Ordnance Fuze Labs., Washington, D. C.
PYROTECHNIC RESEARCH AT DOFL. PART II. PYROTECHNIC DELAYS,
by Raymond H. Comyn. 15 Feb 62, 37p. incl. illus. tables, 51 refs. (DOFL rept. no. TR-1015)
Unclassified report

DESCRIPTORS: (*Pyrotechnics, *Delay elements, *Delay powders for Bomb fuzes, Design, Tests, Test methods.) (Materials, Chromates, Barium compounds, Iron compounds, Oxides, Manganese compounds, Lead compounds, Zirconium compounds, Combustion, Storage, Stability.) Igniters, Primers, Heating elements.

Pyrotechnic delay investigations at DOFL for the past several years are reviewed. Studies include T2, T5, and T6 delay elements; delay ignition; fast and slow burning compositions; storage stability of mixtures; methods for measuring gas and heat evolved by these compositions; mixing procedures; and new methods for employing pyrotechnic mixtures for producing time delays. The burning time dispersions, over the temperature range -65 F to +165 F, will be at least + or - 12 percent under optimum conditions for delays burning within 20 sec and may be twice this value for longer delays or when conditions are less favorable. The present compositions appear to be satisfactory for current DOFL requirements and no further investigations are recommended. (Author)

AD-273 198 Div. 3, 30
(TISTM/EJH) OTS price $2.60

Army Signal Research and Development Lab., Fort Monmouth, N. J.
TECHNIQUES AND EVALUATION OF AEROSOL MEASUREMENTS,
by Hermann E. Gerber. Dec 61, 20p. incl. illus. table, 2 refs. (ASRDL technical rept. no. 2238)
Unclassified report

DESCRIPTORS: (*Aerosols, Particles, Measurement, Sampling, Dosage, *Impingers, Photometers, Light, Scattering, Spectrophotometers, Calibration, Effectiveness.)

The cascade impactor is used in connection with the calibration of the Technol total light-scattering meter. In the compact Technol meter, the amount of scattered light due to a small illuminated sample of particle-carrying atmosphere is related directly to the range of visibility as seen by the human eye. In evaluating the number of particles on the Casella Cascade Impactor, the halo effect and sampling efficiency must be considered; otherwise, counting-errors of up to 600% will result. It is possible to calibrate a light-scatter measuring instrument, such as the Technol meter, by using a homogeneous latex aerosol. The field tests of the Technol meter compared favorably with the laboratory calibration tests. The instrument must be modified to compensate for humidity and a low signal-to-noise ratio. (Author)

4. CHEMISTRY

AD-273 013 Div. 4, 14
(TISTM/BRW) OTS price $2.25

British Cotton Industry Research Association.
POLYMERS RELATED TO CELLULOSE.
Final technical rept. no. 4, 1 Dec 60-30 Nov 61, by J. R. Holker, R. L. Colbran and others. Dec 61, 79p. incl. illus. tables, 46 refs.
(Contract DA 91-591-EUC-1615)
Unclassified report

DESCRIPTORS: (*Oxycellulose, *Polymers, Condensation, Chemical reactions, Carbazides and Hydrazine derivatives of Cyanuric acid or Phosphonyl radicals, Nitrilo radicals.) (Glucosides and Ethanols, Amines or Phenyl radicals, Urea.) (Substitution reactions, Oxidation, Pyrolysis.) Cellulose chemistry.

More condensation reactions of periodate oxycellulose are reported, and a reason is suggested to account for their non-quantitative nature. Some physical properties of the products, many of which are cross-linked, are given. Thiosemicarbazide and cyanuric hydrazide both fail to make oxycellulose flame-resistant, but a limited effect is obtained with phosphonitrilic hexahydrazide, which, even at the low add-on achieved, drastically reduces the amount of tar formed on pyrolysis. Thiosemicarbazones of several aldoses were prepared and, with the exception of that from D-glucuronolactone, were assigned cyclic structures. Periodate-oxidised methyl 4,6-O-benzylidene-alpha-D-glucoside (OMBG) reacts with ethanolamine to form an oxazolidine derivative. Treatment of OMBG with MeOH in the presence of acid leads to removal of the benzylidene group and simultaneous methylation; the product was identified and characterised. Condensation of OMBG with phenylurea yielded a compound of unknown structure; a nitrogen-free product results from treatment with methanolic hydrazine. (Author)

AD-273 033 Div. 4
(TISTM/EJH) OTS price $1.60

Feltman Research Labs., Picatinny Arsenal, Dover, N. J.
THE VELOCITY OF THE DISPLACEMENT REACTION OF COMPLEX IONS (PART 3). THE REACTION VELOCITY OF AQUATION OF CHLOROPENTAMINE COBALT (III) AND cis-CHLOROAQUATETRAMINE COBALT (III),
by Kuroda Koshiro. Mar 62, 12p. incl. illus. tables, 14 refs. (Technical notes FRL TN 100; Trans. from Nippon Kagaku Zasshi 82:181-185, 1961)
Unclassified report

DESCRIPTORS: (*Complex ions, Ions, *Complex compounds, Chlorides, Amines, *Cobalt compounds, Displacement reactions, Chemical reactions, Water, Reaction kinetics, Temperature, Hydrogen ion concentration, Spectrographic analysis.) Japan.

The rate of aquation of $(Co(NH_3)_5Cl)^{++}$, I, and cis-$(Co(NH_3)_4(H_2O)Cl)^{++}$, II, in acid solution was studied by the light absorption method under various temperatures, hydrogen ion concentrations, and ionic strengths. Results showed that the reaction proceeds in the first order manner. An increase of ionic strength somewhat decreases the rate. For I an increase of hydrogen ion concentration does not affect the rate at all, but for II the rate is remarkably affected. The activation energy of aquation of I is 23,500 cal while that for II is 25,000 cal. The results agree well with those by other workers for I and are the first reliable measurements for II. The difference in behavior of II and I is similar to that between cis-$(Co(NH_3)_4(H_2O)NO)^{++}$ and $(Co(NH_3)_5NO_3)^{++}$.

AD-273 048 Div. 4, 14
(TISTM/GEC) OTS price $4.60

Aerospace Corp., Los Angeles, Calif.
THE FLUORIDES AND OXYFLUORIDES OF SULFUR, SELENIUM, AND TELLURIUM,
by Richard Tunder. 27 Nov 61, 38p. incl. table, 138 refs. (Rept. no. TDR-930(2210-12)TN-3)
(Contract AF 04(647)930)
Unclassified report

DESCRIPTORS: (*Fluorides or *Oxyfluorides of *Sulfur compounds, *Selenium compounds, *Tellurium compounds, Synthesis, Chemical reactions, Physical properties, Thermodynamics, Heat of formation.)

A survey of the literature on fluorides and oxyfluorides of S, Se, and Te was made. The results support the following general observations: The relative reactivity of the fluorides of S, Se, and Te increases with increasing atomic weight and with decreasing valence state of the central atom. Substitution of a group larger or less electronegative than F into one of these fluorides increases its reactivity. Of the oxyfluorides discussed, apparently only SOF_4 forms complexes to any great degree. The fluorosulfinates and fluorosulfonates are themselves products of complexing with SO_2 and SO_3. Hexavalent fluorides and tetravalent fluorides of these elements are discussed. The sulfur oxyfluorides, SOF_2, SOF_4 and SO_2F_2, and the more complex oxyfluorides, FO_2SOSO_2F and FO_2SOOSO_2F are also discussed. (Author)

AD-273 125 Div. 4, 14
(TISTM/GEC) OTS price $1.60

Feltman Research Labs., Picatinny Arsenal, Dover, N. J.
PHOTOCHEMICAL NITRATION OF BENZENE AND NITROBENZENE BY NITROGEN OXIDES,
by I. O. Gorislavets. Mar 62, 11p. incl. illus. tables, 8 refs. (Technical notes FRL TN-68; Trans. from Jnl. of Phys. Chem. 17:102-107, 1943)
Unclassified report

DESCRIPTORS: (Chemical reactions, Photochemistry, *Photochemical reactions, *Nitration of *Benzenes and *Nitrobenzenes by Nitrogen compounds and Dioxides, Light, Ultraviolet radiation.) Ultraviolet spectroscopy, USSR.

The photochemical reaction of NO_2 with benzene in the gaseous and the liquid phases and also the reaction of NO_2 with nitrobenzene were studied. In all of these cases the wave-length region corresponding to the excitation process of NO_2 molecules appeared to be active photochemically. In this electron state the NO_2 molecule became chemically active and reacted with both benzene and nitrobenzene with the formation of nitro- and dinitrobenzene, respectively. Study of the photochemical decomposition of nitrobenzene showed that it was accompanied by the liberation of the NO_2 group in the same active, excited state. The agreement of

these data with the arrangement of the electron levels of the NO2 molecule allows certain conclusions about the mechanism of nitration processes of aromatic compounds by means of NO2 and N2O4. (Author)

AD-273 126 Div. 4
(TISTM/GEC) OTS price $1.60

Feltman Research Labs., Picatinny Arsenal, Dover, N. J.
REACTIONS OF ORGANOMETALLIC COMPOUNDS WITH SALTS OF HEAVY METALS. III. REACTIONS OF ORGANO-ALUMINUM COMPOUNDS WITH TITANIUM HALIDES,
by I. I. Boldyreva, B. A. Dolgoplosk, and V. A. Krol. Mar 62, 12p. incl. tables, 12 refs. (Technical notes FRL TN-63; Trans. from Vysokomolekuliarnye Soedineniia 1:900-906, 1959)
Unclassified report

DESCRIPTORS: (Synthesis of *Catalysts, Metal-organic compounds and Salts of *Aluminum compounds and *Ethyl radicals, *Titanium compounds and *Halides, *Complex compounds.) (Catalysis, Polymerization, Stereochemistry, Molecular isomerism.)

A study was made of the products of the interaction of the catalyst components used for producing stereospecific polymers (Ti halides and organoaluminum compounds). During the interaction of alkylaluminum halides and TiCl4, the latter was reduced only to the trivalent state. In the case of ethylaluminum dichloride, an equivalent amount of AlCl3 was formed. The violet modification of TiCl3 did not react with alkylaluminum halides, even at 100 degrees. Triethylaluminum partially reduced TiCl3 to TiCl2 under these conditions. A comparison of the data on the reaction rate of TiCl4 and various organoaluminum compounds afforded the conclusion that the reactivity of the latter decreases as shown in the following series: Al(C2H5)3 greater than Al(C2H5)2Cl greater than Al(C2H5)Cl2. (Author)

AD-273 203 Div. 4
(TISTM/GEC) OTS price $.50

Directorate of Materials and Processes, Aeronautical Systems Div., Wright-Patterson Air Force Base, Ohio.
RAPID MEANS OF MONITORING THE THERMAL DECOMPOSITION OF MAGNESIUM PERCHLORATE, CHLORIDE DETERMINATION.
Rept. for May-June 61 on Compositional, Atomic and Molecular Analysis,
by K. F. Sugawara. Dec 61, 7p. incl. illus. 8 refs.
(Proj. 7360)
(ASD TN 61-135) Unclassified report

DESCRIPTORS: (*Pyrolysis of *Magnesium compounds and *Perchlorates, Measurement by Determination of Chlorides.) (Reagents, Iron compounds, Perchlorates.) Chemical reactions, Spectrophotometers.

A rapid procedure by which the thermal decomposition of magnesium perchlorate can be monitored, is discussed. The method, based upon the spectrophotometric measurement of the iron (III) chloride complex, is simple and accurate. This study showed that the degradation of fused magnesium perchlorate involves the formation of chloride. A rapid means of determining chloride can then be utilized to monitor the decomposition of the salt. (Author)

AD-273 266 Div. 4, 25
(TISTM/EJH) OTS price $2.60

RIAS, Inc., Baltimore, Md.
LEWIS ACID--LEWIS BASE ADDITION COMPOUNDS OF BORON-CONTAINING MOLECULES AND THEIR CHARGE TRANSFER COMPLEX BEHAVIOR,
by Joyce J. Kaufman. 25 Jan 62, 27p. incl. illus. tables, 15 refs. (Technical rept. no. 1)
(Contract Nonr-347100, Proj. NR 356-433)
Unclassified report

DESCRIPTORS: (*Boron compounds, Hydrides, *Organoboranes, *Complex compounds, Pyridines, *Electron transitions, Atomic energy levels, Quantum mechanics.) Metalorganic compounds.

A new class of Lewis acids and Lewis bases - delocalized electron-deficient molecules such as the higher boron hydrides - with properties formally analogous to those of delocalized pi-electron systems was defined. On this basis, the behavior of ZB10H12Z and ZB9H13 complexes can be described in terms of charge transfer complex theory. ZB10H12Z and ZB9H13 compounds (when Z is a neutral molecule even electron donor) form an almost unique class of compounds in that they combine features of both intermolecular and intramolecular charge transfer complexes. The long wave length transitions in PyB10H12Py complexes (Py = pyridine) are shown to be dependent upon the energies of the pi lowest unfilled molecular orbitals (LUMO) of the substituted pyridines. From the differences in the wave lengths of analogous bands, the highest occupied molecular orbital (HOMO) of B10H12 must be 0.83 ev above that of B9H13. If reasonable numerical substitutions for alpha, beta and gamma are made in the energy expression for the pi LUMO, the energies of the HOMO of B10H12 and B9H13 below the zero of the energy scale can be estimated. (Author)

AD-273 294 Div. 4
(TISTM/BRW) OTS price $13.00

Central Inst. for Industrial Research (Norway).
KINETICS OF METAL/METALION ELECTRODES IN AQUEOUS SOLUTIONS,
Annual technical rept., 1 Jan-31 Dec 61,
by Tor Hurlen. Jan 62, 1v. incl. illus. tables, refs.
(Contract DA 91-591-EUC-1660)
Unclassified report

DESCRIPTORS: (*Copper electrodes, *Zinc electrodes, Copper, Zinc, *Electrochemistry, Electrodes, Metals, Ions, *Reaction kinetics, Acids, Solutions, Bromides, Chlorides.)

This report includes:
ELECTROCHEMICAL BEHAVIOUR OF COPPER. III. IN ACID BROMIDE SOLUTION, by Tor Hurlen. May 61, 50p. incl. illus. tables, 25 refs. (Special rept. no. 1; SI publ. no. 319)
(Contract DA 91-591-EUC-1660)

ELECTROCHEMICAL BEHAVIOUR OF COPPER IN ACID CHLORIDE SOLUTION, by Tor Hurlen. Oct 61, 67p. incl. illus. tables, 41 refs. (Special scientific rept. no. 2; SI publ. no. 349, Supersedes SI publ. no. 305, AD-252 811)

ELECTROCHEMICAL BEHAVIOUR OF ZINC, by Tor Hurlen. Jan 62, 48p. incl. illus. 42 refs. (Special scientific rept. no. 3; SI publ. no. 356)

Contents: Electrochemical behavior of Cu in acid bromide solution, Depolarized dissolution of

Cu by cubric ions in acid bromide solution, Deposition and dissolution of cuprous bromide on Cu in acid bromide solution, Electrochemical behavior of Cu in acid chloride solution, Dissolution of Cu by oxidation agents in acid chloride solution, Film growth on Cu in cupric chloride solutions, Dissolution of cuprous chloride in acid chloride solution, On the kinetics of the Zn/Zn (++) (aq) electrode, Corrosion of Zn: Effect of pH, and Heats of activation of the Zn/Zn (++) (aq) electrode.

AD-273 407 Div. 4
(TISTM/GEC) OTS price $1.60

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson Air Force Base, Ohio.
THE DETERMINATION OF RATE CONSTANTS OF ELEMENTARY REACTIONS OF HYDROGEN ATOMS,
by L. I. Avramenko and R. V. Kolesnikova.
13 Feb 62, 13p. incl. illus. table, 10 refs.
(Trans. no. FTD-TT-62-14 of Izvestiya Akademii Nauk SSSR Otdeleniye Khimicheskikh Nauk, no. 11:pp. 1971-1976, 1961)
Unclassified report

DESCRIPTORS: (*Hydrogen, Atoms, *Hydroperoxides, *Hydroxides, Chemical reactions, Recombination reactions, Reaction kinetics, Paramagnetic resonance.) USSR, Peroxides.

The rate constant of the trimolecular process of formation of HO2 in the reaction between H atoms and O2 molecules at room temperature was determined. The rate constant of recombination of H atoms during triple collisions was determined. The electroparamagnetic resonance spectrum of the HO2 radical frozen from the gaseous phase was recorded at the temperature of liquid N. The great capacity of the HO2 radical to be converted into H2O2 was detected. (Author)

5. COMMUNICATIONS

AD-273 068 Div. 5, 12
(TISTM/RD) OTS price $14.50

General Mills, Inc., Minneapolis, Minn.
LARGE PASSIVE SATELLITE STUDY. VOLUME I. THEORETICAL ANALYSIS. VOLUME II. DESIGN AND PACKAGING.
Final rept.
21 Feb 61, 216p. incl. illus. tables, refs.
(Rept. no. 2149)
(Contract Nonr-324500)
Unclassified report

DESCRIPTORS: (*Satellite vehicles for *Communication systems, *Radio communication systems.) (Reflection, Scattering of Microwaves, Radio waves from Satellite vehicles, *Spheres, Metals.) (Effect of Gravity, Magnetic fields, Electromagnetic fields on Satellite vehicles.) (Deformation of Structural shells from Thermal stresses.) (Feasibility studies of Materials for Surfaces of Satellite vehicles.) Feasibility studies of Configuration for Satellite vehicles.

Contents:
Passive communication satellites with directional reflection characteristics
Spherical satellites
Polyhedral satellites
Forces on a thin shell spherical satellite in orbit
Static charge on the satellite
Electrostatic force
Effect of the earth's magnetic field
Deformation of a thin shell spherical satellite due to thermal stresses
Solar spectral intensity distribution
Surface characteristics of metals
Reflectance of evaporated aluminum
Reflectance of evaporated silver, gold, and copper films
Absorptance and transmittance of evaporated films

AD-273 111 Div. 5
(TISTE/CDM) OTS price $13.50

Radiation, Inc., Melbourne, Fla.
EXPERIMENTAL INVESTIGATION OF CHAFF TRANSMISSION IN THE 1300 TO 1800 MC FREQUENCY RANGE.
Quarterly progress rept. no. 2, 1 Oct-31 Dec 61, by L. H. Bauer. 31 Dec 61, 194p. incl. illus. tables.
(Contract DA 36-039-sc-88897)
Unclassified report

DESCRIPTORS: (*Radio communication systems, *Secret communication systems, *Radio relay systems, Ultra high frequency, Reflectors, Reliability, Design, Tests.) (Communication equipment, *Radar confusion reflectors, *Radio transmission.) (Radio signals, Radio waves, Propagation, Reflection, Scattering.)

Research continued to determine the feasibility of communicating between two terminals via chaff clouds, employing low power radio relay equipment operating at 1300 to 1800 mc. Experimental effort has been divided into two phases. Phase I utilizes chaff dispensed at 10,000 ft and a site separation of 4 to 6 mi. Phase II will use rockets to dispense chaff at 200,000 ft and site separation will be from 100 to 200 miles. Fourteen chaff drops were made, of which 12 produced scatter data. The results of six drops are presented. Also reported is an analysis of the feasibility of Phase II tests. The behavior of bistatic scattering cross section of the chaff cloud was characterized by a rapid increase to a constant value shortly after the chaff was dropped. Chaff fall rates were measured, and ranged from approximately 200 to 100 ft per min. for an altitude range of 10,000 to 5,000 ft. It was concluded that the White Sands test of Phase II were not feasible with the existing equipment. Experiments utilizing a 54-mi. site separation with chaff dispensed at an altitude of 15,000 ft were feasible. (Author)

AD-273 196 Div. 5, 6
(TISTE/CRJ) OTS price $1.60

Rome Air Development Center, Griffiss Air Force Base, N. Y.
ANTI-MULTIPATH TESTS OF A RANDOM NOISE CARRIER SYSTEM.
Final rept.,
by Michael A. Messineo and Ralph W. Mifflin.
Feb 62, 14p. incl. illus. 5 refs. (Rept. no. RADC TDR 62-12)
(Proj. 4519)
Unclassified report

DESCRIPTORS: (*Air force communications, *Radio communication systems, Radio anti-jamming, Correlation techniques, Diversity systems.) (*Radio transmission, *Multipath transmission, Modulation, Signal-to-noise ratio, Theory.) (Radio receivers, Radio transmitters, Sidebands.)

Anti-multipath tests of a wide-band noise carrier system utilizing the transmitted reference technique are described. Theoretical signal-to-noise calculations are shown. Test results over a several thousand mile, high-frequency circuit are presented and discussed. Recommendations are made for future applications of this type of system. (Author)

AD-273 273 Div. 5, 6, 12
(TISTW/EET) OTS price $6.60

Philco Corp., Blue Bell, Pa.
STUDY AND INVESTIGATION OF ACQUISITION AND TRACKING OF OPTICAL COMMUNICATION SYSTEMS.
Interim engineering rept. no. 3, 1 Dec 61-28 Feb 62,
by R. F. Anderson. 28 Feb 62, 61p. incl. illus. tables, 1 ref. (Rept. no. 9036-3)
(Contract AF 33(616)8392)
Unclassified report

DESCRIPTORS: (*Light communication systems, *Optical tracking, Communication systems, Tracking, *Satellite vehicles, *Lunar probes, *Spaceships, Communications theory.) (Satellite attitude, Gyroscopes, Orbital flight paths.) (Satellite attitude, Stabilization.) (Tracking with Thin films, Detectors.) (Satellite vehicles, Attitudes, Configuration.) Signal-to-noise ratio, Photomultipliers.

Progress is reported on the study and investigation of acquisition and tracking for two hypothetical, optical, space-communications links. The development of techniques and configurations, and the investigation of specific items which affect the selection of techniques and configurations are discussed. The specific items are: satellite orbital motions, satellite and vehicle attitude, scanning geometry, probability functions in acquisition regions, tracking, Bradley and transit time errors, and configurations. (Author)

AD-273 405 Div. 5, 8
(TISTE/NTM) OTS price $2.60

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson Air Force Base, Ohio.
REMOTE-CONTROL AND REMOTE-SIGNAL SYSTEMS,
by V. S. Malov. 13 Feb 62, 24p. incl. illus. 17 refs. (Trans. no. FTD-TT-61-17 of Gosudarstvennoye Energeticheskoye Izdatel'stvo, Moscow-Leningrad (Chapter 4):pp 66-88, 1960)
Unclassified report

DESCRIPTORS: (*Remote control systems, Command systems, USSR.) Communication systems, Pulse generators, Trigger circuits, Control systems, Coding, Signals, Electric relays, Magnetic core switches.

Contents:
Some of the most important connections and units of remote-control devices
Systems with electrical division (Multiwire)
Systems with frequency division
Systems having time division
Shielding from the execution of distorted signals

6. DETECTION

AD-273 006 Div. 6, 25
(TISTW/RD) OTS price $11.00

Radiation Lab., U. of Michigan, Ann Arbor.
STUDIES IN RADAR CROSS SECTIONS XLVII. DIFFRACTION AND SCATTERING BY REGULAR BODIES - I: THE SPHERE,
by R. F. Goodrich, B. A. Harrison and others.
Dec 61, 135p. incl. illus. 48 refs. (Scientific rept. no. 1; Rept. no. 3648-1-T)
(Contract AF 19(604)6655, Proj. 5635)
(AFCRL 62-40) Unclassified report

DESCRIPTORS: (Mathematical analysis of *Radar echo areas from *Spheres.) (Diffraction, Scattering of Electromagnetic waves from Spheres.) Transformations (Mathematics), Bessel functions, Functions.

Information about the scattering properties of selected bodies of simple shape is summarized. Some of the more useful forms of solution of the problem of the diffraction of electromagnetic energy by a sphere, both exact and approximate, are given. Also a brief account of the methods of derivation is included. Wherever possible references are presented to tabulations of the functions and series involved, particularly in connection with the standard Mie solution. A description is given of the Mie solution since this is the starting point for most of the other approaches. High frequency scattering behavior is discussed using the approach based on the Watson transform. The physical optics approach is considered insofar as it applies to the sphere problem. (Author)

AD-273 074 Div. 6
(TISTB/LH) OTS price $8.10

Lockheed Aircraft Corp., Sunnyvale, Calif.
HIGH-RESOLUTION AND LONG-RANGE TECHNIQUES FOR RADAR APPLICATIONS. AN ANNOTATED BIBLIOGRAPHY,
comp. by George R. Evans. Jan 62, 84p. (Special bibliography no. SB-61-51; Rept. no. 3-80-61-27)
Unclassified report

DESCRIPTORS: (*Radar, Radar ranges, *Radar tracking, Radar deception, Countermeasures, Doppler radar, *Search radar, *Radar signals, *Radar pulses.) *Bibliography.

AD-273 113 Div. 6
(TISTW/DLW) OTS price $2.60

Antenna Lab., Ohio State U. Research Foundation, Columbus.
UNIQUE DETECTION TECHNIQUES.
Final engineering rept., vol. 2.
30 Nov 61, 20p. incl. illus. 6 refs. (Rept. no. 1040-3)
(Contract AF 33(616)6849)
Unclassified report

DESCRIPTORS: (Detectors, *Microwave equipment, *Optical equipment, *Magneto-optic rotation, *Paramagnetic crystals, Magnetic fields, Crystal detectors, Lattices, Nuclear spins, Crystal structure, Relaxation time, Superregeneration, Theory, Design, Sensitivity.) (Electromagnetic waves, *Microwaves, Resonance absorption, *Light, Modulation, Radiofrequency power, Detection.)

A study was concluded of unique detection techniques. Experimental results obtained with a microwave detector utilizing microwave-optical interaction in paramagnetic crystals are reported. Two other applications of Faraday rotation in paramagnetic crystals are described; they are optical light modulation and spin-lattice relaxation time measurement. (Author)

AD-273 157 Div. 6, 8
(TISTW/DLW) OTS price $9.10

Southwest Research Inst., San Antonio, Tex.
USE OF THE BEVERAGE ANTENNA IN WIDE APERTURE HIGH FREQUENCY DIRECTION FINDING.
Interim rept. no. 5, 5 Oct 61-4 Jan 62,
by Douglas N. Travers and Ray E. Cooper.
7 Feb 62, 100p. incl. illus. tables, 24 refs.
(Contract NObsr-85364)
Unclassified report

DESCRIPTORS: (*Direction finding, Bearing finding, High frequency, *Antennas, Wire, Radio reception, Antenna radiation patterns, Effectiveness, Tests.)

Investigations were made to determine the effectiveness of the beverage antenna as the basis of a wide aperture high frequency direction finder. Analytical findings and test results are presented for 2 working circular arrays differing in size. The characteristics and design parameters were studied of the single beverage antenna. The antenna had many useful properties for HF DF including aperiodic impedance, highly directive azimuth patterns, wide aperture type response and very low installation cost and maintenance. Circular arrays and methods of communication were also studied. The circular array may be commutated in several ways, three of the most important being: (1) sequential switching, (2) simplified Wullenweber type goniometer scanning, and (3) sum-and-difference scanning with a twin channel receiver. It was concluded that the beverage antenna is suitable for wide aperture HF DF with accuracy comparable to other types of wide aperture systems and at lower cost than any other known type. (Author)

AD-273 240 Div. 6, 25
(TISTP/FR) OTS price $3.60

Motorola, Inc., Riverside, Calif.
PULSED LIGHT INVESTIGATION.
Interim engineering rept. no. 5, Dec 61-Feb 62,
by William J. Nolan, Jr. Mar 62, 35p. incl. illus. (Rept. no. RLI-3854-5)
(Contract AF 33(616)7680)
Unclassified report

DESCRIPTORS: (Light pulses, *Sparks, *Electric arcs, *Mineral oils, Design, Illumination.)

A trigger gap was built for use with a vinyl sleeve spark discharge chamber. Although operation was fairly reliable at 5000 volts, it was very erratic at 10,000 volts. At the lower voltage, the energy lost in the trigger gap was prohibitive, so further work was confined to operation with a simple spark gap. To obtain more reliable control of breakdown voltage, a circuit was built to permit charging of the storage capacitor in about three msec. Measurements of brightness showed that the oil-immersed spark produced a very small bright source, having generally much shorter rise and fall times than had been previously observed. The behavior was also more erratic than is characteristic of spark discharges in air. (Author)

AD-273 262 Div. 6
(TISTP/TL) OTS price $2.00

Tracerlab, Inc., Waltham, Mass.
RESEARCH ON THE FEASIBILITY OF PROPELLANT DETECTION BY INDUCED RADIOACTIVE TECHNIQUES.
Rept. for 1 Jan-15 Oct 61 on Health Hazards of Materials and Radiation,
by Frederick J. Brousaides, Richard Bersin and others. Dec 61, 68p. incl. illus. tables, 40 refs.
(Contract AF 33(616)7846, Proj. 7165)
(ASD TR 61-654) Unclassified report

DESCRIPTORS: (*Feasibility study, *Propellants, *Detection in the Atmosphere by *Radioactivation analysis.) (Gases, *Radioactive isotopes, Krypton, Oxidation-reduction reactions.)

The feasibility of detecting small quantities of toxic propellants in the atmosphere by utilizing the decay characteristics of radioactive materials was studied. Activation analysis and inverse radionctive tracer techniques were used. The latter may be defined as processes in which a constituent to be analyzed undergoes a reaction (or reactions) which results in the ultimate release of a radioactive tracer gas whose concentration is proportional to the original constituent to be analyzed. Five toxic materials were selected for investigation; they included nitrogen dioxide, hydrazine, unsymmetrical dimethyl hydrazine, boron hydrides, and beryllium oxide. Emphasis was placed upon the use of Kr-85 quinol clathrates for the detection systems. Properly controlled, these systems were found to be selective to a narrow band of redox materials and gave predictable responses to toxic gas concentrations. (Author)

AD-273 421 Div. 6
(TISTW/RD) OTS price $19.75

General Communication Co., Boston, Mass.
DESIGN AND PRODUCTION OF RADAR TEST SET FOR TEST GROUND-BASED RADAR SYSTEMS IN THE C, S AND X-BANDS.
Final rept. (rev.) Aug 55-June 61 on Development of Radar Test Set AN/UPM-88( ),
by Roland R. Gordon, David W. Johnson and Harvey L. Guilbault. June 61, 286p. incl. illus. tables, refs.
(Contract DA 36-039-sc-70106, Proj. 3C16-08-001)
Unclassified report

DESCRIPTORS: (Design, Manufacturing methods, Production of *Test sets, Radar beacons for Tests on Radar equipment in C band, S band, X band.)

Research is presented on the design, development and fabrication of the Radar Test Set AN/UPM-88. The unit is a general purpose field transponder beacon designed for use as an aid on testing ground based radar systems in the C, S and X-bands. It may be used as airborne equipment or in ground-based systems. It can be mounted in ground vehicles, airborne devices, on towers or be carried by hand. The beacon responds to coded pulse interrogation from several nonsynchronized radar sets. Radar sets similar to SCR-584 (modified) and the AN/TPQ-5 will be among those interrogated. To achieve high performance characteristics in the equipment, special techniques and custom components were developed. Typical of these unique features are self-calibration, interchangeable RF heads and an automatic reply limiter. (Author)

7. ELECTRICAL EQUIPMENT

AD-273 049 Div. 7
(TISTM/EJH) OTS price $4.60

Lockheed Aircraft Corp., Sunnyvale, Calif.
BASIC RESEARCH IN FUEL CELLS: AMMONIA, ETHYLENE GLYCOL, AND UREA SYSTEMS.
Final rept., 1 July 60-31 Aug 61.
Nov 61, 41p. incl. illus. tables, 9 refs.
(Contract DA 44-177-tc-634)
(TCREC TR 61-135) Unclassified report

DESCRIPTORS: (*Fuel cells, *Wet cells, *Electrolytic cells, Electrodes, *Anodes (Electrolytic cell), *Cathodes (Electrolytic cell), Catalysts, Platinum, *Fuels, *Ammonia, Ethylenes, *Glycols, *Urea, Electrolytes, Potassium compounds, Hydroxides, Carbonates.)

Research work was conducted on electrochemical fuel cells operating with NH_3, ethylene glycol, or urea fuel. This work was primarily with aqueous, low temperature systems in K_2CO_3 or KOH electrolytes. The program included an electrode preparations and electrochemical evaluations study, the use of gas adsorption techniques and other methods in catalyst evaluation, and preliminary engineering and design studies on fuel cell batteries. Experiments showed that one of the basic systems studied, aqueous NH_3 and glycol anodes show definite promise, whereas the urea system did not. The acid glycol and the acid urea systems were not promising. Oxidation of the NH_3 to N and water was 100% complete. A typical NH_3 anode potential (2.2M NH_3, 30% KOH, 50 C, current density equals 1.0 ma/sq. cm) is 0.5 v. (Author)

AD-273 128 Div. 7, 13, 19
(TISTE/NTM) OTS price $4.60

Airesearch Mfg. Co., Phoenix, Ariz.
POWER GENERATION, DISTRIBUTION AND AIR CONDITIONING STUDY FOR AUGMENTED FOUR-WHEELS SYSTEM.
Final rept.,
by Lloyd Herendeen and Paul Bliklen. 31 Oct 61, 41p. incl. illus. tables, 5 refs.
(Contract AF 19(604)8015, Proj. 2124)
(AFCRL-389, addendum no. 1)
Unclassified report

DESCRIPTORS: (*Generators, *Power supplies, *Air conditioning equipment, Coolants, *Communication equipment for *Air traffic control systems, Trailers.) (Motor generators, Frequency converters, Gas turbines, Maintenance, Reliability.) (Radio communication systems, Transmitter receivers, Direction finding, High frequency, Very high frequency, Ultrahigh frequency.)

One additional van was added to the Augmented Four Wheels system. This van, known as an Air Traffic Control Set AN/TSW-6, is a tower van and contains communications equipment similar to that in the Air Traffic Control Central Van. The tower van is similar to and compatible with the other vans in the augmented system. Discussions are presented on the following: 60-c loads, frequency converters, reliability, maintenance, generators, optimum frequency, and uninterrupted power.

AD-273 286 Div. 7
(TISTE/NTM) OTS price $1.50

ARINC Research Corp., Washington, D. C.
FAILURE RATES AND FAILURE MODES OF SMALL ROTARY ELECTRICAL DEVICES.
Special rept.,
by William H. von Alven, J. M. Evans and W. B. Reese. Nov 61, 46p. incl. illus. tables (Pub. no. 160-2-269R; Supersedes Pub. no. 160-2-269, AD-267 315)
(Contract AF 33(600)42462)
Unclassified report

DESCRIPTORS: (*Electrical equipment, Military equipment, *Reliability, Mathematical prediction.) (*Electric motors, Alternating current, Direct current, Synchro receivers, *Motor generators, *Servo motors, *Synchros, *Failure (Mechanics), Airborne, Shipborne, Bearings, Lubrication, Brushes, Analysis.)

Failure rates and modes are presented for small rotary electrical devices -- ac, dc, and servo motors, resolvers, motor generators, and synchros. Data were derived from more than 12-million device operating-hours and more than 500 failures, and from a failure mode analysis of 2,255 failed units. Significant findings were: (1) individual equipment failure rates show great variability between individual applications; (2) the average failure rates for airborne equipment are significantly higher than for shipborne equipment; (3) field failure rates vary widely among systems for each type of device; (4) mechanical problems dominate the failure modes for motors; and (5) electrical problems dominate the failure patterns for slow-speed rotary electrical devices. (Author)

AD-273 299 Div. 7, 4
(TISTM/GEC) OTS price $2.50

Florida U. Engineering and Industrial Experiment Station, Gainesville.
AIR REGENERATION OF BROMINE-BROMIDE FUEL CELL CATHOLYTE.
Master's thesis,
by William Edward Reneke. Aug 61, 111p. incl. illus. tables.
Unclassified report

DESCRIPTORS: (*Fuel cells, Power supplies, *Hydrogen compounds, *Oxygen, *Bromides, Oxidation to Bromine, Electrolytic cells, Chemical reactions, Catalysts, Nitrogen compounds, Oxides, Oxidation-reduction reactions.) Chemical analysis.

A packed tower was evaluated for the air oxidation of hydrobromic acid to Br using NO as a catalyst. Without NO, no oxidation occurred. When NO was added, serious errors were found in the analytical procedure used by earlier workers. A suitable method for the analysis of Br in the presence of oxides of N was sought but none was found. Using existing data and data taken from the operation of the column, a packed column for the regeneration of Br from hydrobromic acid was roughly sized. The estimated size proved to be very large in relation to the power it would be expected to supply and it was concluded that a packed tower was not suitable for this purpose. It was further concluded that a closed system using high concentrations of NO and supplied with pure O would be a suitable means of regenerating Br from hydrobromic acid. (Author)

AD-273 422 Div. 7, 8, 25
(TISTM/BRW) OTS price $7.60

Weston Instruments Div., Daystrom, Inc., Newark, N. J.
VARIABLE PRECISION METAL-FILM RESISTORS.
Interim development rept., 30 Sep 61-28 Feb 62 on Phase 1.
9 Mar 62, 71p. incl. illus.
(Contract NObsr-77548)
Unclassified report

DESCRIPTORS: (Metal films, *Variable resistors, *Potentiometers, Design, Production, Tests.) (Graphite, Sliding contacts, Resistance, Erosion, Noise.)

Investigations were concentrated on the determination of wear and noise properties of the graphite contactor. Single and multiple contactors were tested on smooth substrates (smooth Pyrex and glazed steatite) and rough substrates (etched Pyrex, raw steatite, and raw Alumina). Contactors were also evaluated as to size or surface area. The adherence of the graphite wear particles to the film or overlay caused a drop in total resistance and is generally in the order of 3 - 5%. The drop occurred early in testing, and investigation showed this period to be about 30,000 c, before resistance stability is established. Contactor wear particles which do not adhere to the film build up at the reversal points of the cycle did not cause any resistance change or noise. They are free, however, and may cause shorting of the unit to the case. (Author)

8. ELECTRONICS AND ELECTRONIC EQUIPMENT

AD-273 029 Div. 8, 25
(TISTP/JW) OTS price $1.60

Electrical Engineering Research Lab., U. of Texas, Austin.
RESEARCH ON MILLIMETER WAVE PROPAGATION AT HIGH ALTITUDES.
Semi-annual engineering rept., 1 Sep 61-28 Feb 62.
28 Feb 62, 9p. illus.
(Contract AF 33(657)7333, Proj. 1002)
Unclassified report

DESCRIPTORS: (*Microwave spectroscopy, Instrumentation, Tests, Oxygen.) (*Radiometers, Atmospheric refraction, Extremely high frequency, *Microwaves, High altitude, Propagation.)

The status is presented of research activities involving laboratory microwave spectroscopy measurements of the shape and intensity of oxygen absorption lines at simulated pressure altitudes to 100,000 feet in the 58-62 kmc frequency interval, total atmospheric absorption measurements at various frequencies in the same interval using solar radiometric techniques, and instrumentation design and development for radiometric observations in the same frequency interval at various actual altitudes using a balloon borne package. (Author)

AD-273 045 Div. 8
(TISTE/CDM) OTS price $1.60

Stanford Research Inst., Menlo Park, Calif.
INVESTIGATION OF ARRAY AND LENS-TYPE SCANNING ANTENNAS.
Final rept., 1 Apr-30 Nov 61,
by M. G. Andreasen. Nov 61, 6p.
(Contract AF 19(604)8059, Proj. 4600)
(AFCRL 62-49)
Unclassified report

DESCRIPTORS: (*Radar antennas, *Coupled antennas, Design using Radio interferometers.) (Wire screens, Microwave frequency, *Lens antennas, Radar scanning, Electronic scanners, Theory, Design.) (Direction finding, Communication equipment, High frequency, Antennas.)

An investigation was made of array and lens-type scanning antennas. High-resolution antenna arrays were developed with relatively few antenna elements by using interferometer techniques combined with suitable signal-processing circuitry. Further, theoretical and experimental design information was derived for a novel beam-scanning lens antenna that is useful at frequencies as low as the HF band. The lens consists of a pair of wire grids with square, hexagonal, or triangular mesh. Some work was done on nonuniformly spaced arrays. The results of this study, however, were not very promising. (Author)

AD-273 056 Div. 8, 30
(TISTE/NTM) OTS price $3.60

Antenna Lab., Ohio State U. Research Foundation, Columbus.
A MEMORANDUM ON AN X-BAND RADIOMETER STUDY.
Rept. on Investigation of Low-Noise Antenna Systems,
by David Wortendyke. 15 Dec 61, 30p. incl. illus. 14 refs. (Rept. no. 1041-3)
(Contract AF 19(604)6134)
(AFCRL 62-74) Unclassified report

DESCRIPTORS: (*Radiometers, X band, Direct current, Alternating current, Switching circuits, Calibration, Instrumentation, Test equipment, Design.) (*Parabolic antennas, Noise (Radar), Noise (Radio), Reflectors, Aluminum, Glass textiles, Lenses, Microwaves, Reflection, Wire screens, Measurement.)

The principles of a dc and an ac (switching) radiometer are described. A discussion and demonstration are given of a novel calibration of a switching (Dicke) radiometer. The advantages of a nulling system are shown in a radiometer which was built to perform low noise temperature antenna studies. This instrument was used in experiments for: (1) comparison of aluminum and metalized fiber glass 4-ft diameter parabolic reflectors; (2) measurement of the noise temperature of microwave lenses; and (3) measurements of power reflection coefficients of wire mesh screens. (Author)

AD-273 075 Div. 8, 25, 5, 30
(TISTP/JW) OTS price $21.00

Research Lab. of Electronics, Mass. Inst. of Tech., Cambridge.
(No title).
Quarterly progress rept. no. 64,

by H. J. Zimmermann, G. G. Harvey and W. B. Davenport, Jr. 15 Jan 62, 375p. incl. illus. tables, refs.
(Contract DA 36-039-sc-78108, Proj. 3-99-00-000)
Unclassified report

DESCRIPTORS: (*Electronics, X-ray spectroscopy, Physical chemistry, Thermodynamics, Microwave spectroscopy, Masers, Nuclear magnetic resonance, Microwaves, Molecular beams, Radio astronomy, *Plasma physics, Magnetohydrodynamics, *Communications theory, Languages, Neurology, Speech.)

AD-273 101 Div. 8, 25
(TISTE/CAM) OTS price $10.50

Centre de Physique, Electronique et Corpusculaire (France).
RESEARCH ON NOISE IN CROSSED FIELD DEVICES.
Quarterly rept. no. 1.
Oct 61, 1v. incl. illus. 21 refs. (Rept. no. WR-780)
(Contract DA 91-591-EUC-1807)
Unclassified report

DESCRIPTORS: (*Electron guns, *Electron beams, *Optical systems, *Magnetic fields, Noise (Radio), Measurement, Tests, Test equipment, Theory, France.) Magnetrons, Cathodes (Electron tubes), Temperature, Electrons, Electrodes, Electric current, Impedance, Voltmeters, Oscilloscopes, Diodes, Space charges.

Contents:
Study of the line sole space
Study of the gun
Tests on diodes
Tests on the crossed field gun
Tests on the optical system no. 2
Coaxial structure
Tests on the optical system no. 3 for high voltage operations
Noise measurements
Correlation coefficient
Oscillation
Oscillogramms of the noise

AD-273 106 Div. 8
(TISTE/NTM) OTS price $12.50

Hazeltine Research Corp., Little Neck, N. Y.
DEVELOPMENT OF ANTENNA GROUP OA-1227(XE-1)/TPS.
Final technical rept., 25 June 57-1 May 61,
by Gerold W. Bugen and Paul L. Dominique.
1 May 61, 171p. incl. illus. tables (Rept. no. 10075)
(Contract DA 36-039-sc-74866)
Unclassified report

DESCRIPTORS: (*Parabolic antennas, *Radar antennas, L band, Search radar, Identification systems, Mobile, Antenna radiation patterns, *Antenna horns, Antenna hardware, Design.) (Radiofrequency cables, Coaxial cables, Transmission lines, Coupled antennas, *Waveguides, Standing wave ratios, Measurement.) (Antennas, Control systems, Control boxes, Circuits, Synchro data, Tests.) (Radar antennas, Shelters.)

The development is presented of antenna group OA-1227(XE-1)/TPS, a high gain transportable L-band antenna system designed for use with radar set AN/TPS-1D as installed in the Radar Surveillance Center AN/GSS-1. The system transmits and receives both search radar and IFF signals. The radar pulses at 1250 - 1350 mc while the IFF pulses at 1020 + or - 18 mc and 1100 + or - 18 mc. The antenna reflector contour and size is based on the existing fixed station antenna OA-1124/FPS. The antenna is transportable in 2 transit cases designed to fit on an M-35 truck or its equivalent. Also presented are shelter modifications.

AD-273 122 Div. 8, 15
(TISTP/TL) OTS price $2.60

Case Inst. of Tech., Cleveland, Ohio.
TWO AND THREE ELEMENT-KIND EQUIVALENT NETWORKS,
by James D. Schoeffler. 30 Jan 62, 20p. illus. 3 refs. (Technical rept. no. 3)
(Contract Nonr-114110, Proj. NR-375 370)
Unclassified report

DESCRIPTORS: (*Electrical networks, Theory, Transformations (Mathematics), *Matrix algebra.)

The generation of equivalent one element-kind networks by a linear transformation applied directly to the parameter matrix of the network rather than the terminal matrix was recently demonstrated. In this analysis, the technique is extended to two and three element-kind networks. It is shown that equivalent networks can be generated by applying different transformations to each of the parameter matrices provided that each transformation satisfies the conditions for the equivalence of one element-kind networks and provided that each of the transformations when applied to the rows of the cut set matrix transform these rows into identical linear combinations of themselves. The parameter matrices can be modified so that the same transformation matrix can be applied to each of the parameter matrices, and in this case it is shown that the columns of the transformation matrix must be eigenvectors of a generalized eigenvector problem. (Author)

AD-273 123 Div. 8
(TISTP/TL) OTS price $7.60

Airborne Instruments Lab., Inc., Deer Park, Long Island, N. Y.
NEW METHODS FOR MEASURING SPURIOUS EMISSIONS.
Quarterly progress rept. no. 1,
by J. Goldberg, O. Hinckelmann and others.
Aug 61, 73p. incl. illus. tables, 10 refs.
(Rept. no. 1112-I-1)
(Contract AF 30(602)2511, Proj. 1112)
(RADC TDR 62-97) Unclassified report

DESCRIPTORS: (*Microwaves, *Radio transmitters, Measurement, *Dipole antennas, Circuits, Electric fields, Waveguides, Transmission lines, *Microwave networks.)

New, simpler, and more accurate methods of measuring the spurious-emission power of microwave transmitters are being investigated. Two of the methods--movable-probe and fixed-probe--measure the spurious power in an enlarged waveguide section inserted in the transmission line; a third--the free-space method--measures the spurious power externally at the antenna feed horn. In all of the methods, the probes are connected to circuits that frequency-filter, detect, and sum the amplitudes of the voltages induced on the probes at various points in the electric fields and indicate the spurious power of the transmitter at the frequencies of interest. (Author)

AD-273 130 Div. 8
(TISTE/NTM) OTS price $8.60

International Rectifier Corp., Los Angeles, Calif.
HIGH VOLTAGE SILICON RECTIFIER STACKS.
Quarterly progress rept. no. 2, 24 Sep-24 Dec 61 on Production Engineering Measure,
by Edward J. Diebold. 24 Dec 61, 97p. incl. illus. tables, 5 refs.
(Contract DA 36-039-sc-85977)
Unclassified report

DESCRIPTORS: (*Rectifiers, *Silicon, *Diodes, Electron tubes, Semiconductors, Thermodynamics, Design, Production, *Manufacturing methods, Tests, Test methods, circuit testers, Reliability.)

Research continued on the design and development of high voltage silicon rectifier stacks. The design of the final units advanced considerably and the third engineering samples are planned to be substantially in accordance with the envisioned mechanical design of final units. The development of a new, more reliable diffused diode was started. The second engineering samples were slightly delayed mainly because of the tightened requirements of the diodes. Test methods for the high voltage rectifier stacks were investigated and a test circuit was proposed. (Author)

AD-273 138 Div. 8, 14
(TISTM/GEC) OTS price $3.60

Motorola, Inc., Phoenix, Ariz.
RESEARCH AND DEVELOPMENT FOR SURFACE PROTECTION FOR SILICON DEVICES,
by Robert J. Gnaedinger, Jr., Henry W. Cooper, and Steward S. Flaschen. Oct 61, 26p. illus.
(Scientific rept. no. 1)
(Contract AF 19(604)8358)
Unclassified report

DESCRIPTORS: (*Transistors, *Dielectrics, *Germanium, *Silicon, *Semiconductors, Surfaces, Surface properties, Dielectric properties.) (Processing, Aging, Encapsulation, Controlled atmospheres, Control of Water vapor with Barium compounds, Oxides, Nitrogen, Oxygen, Hydrogen compounds, Boron compounds, Dioxides.) (Oxidation, Silicon, Silicon compounds, Dioxides, Temperature.)

Phenomena and mechanism of surface change were studied for the development of methods for surface protection of Si devices. Studies of high temperature aging of Si and Ge transistors encapsulated with adsorptive and reactive getters are discussed. BaO getter in O or N ambient seems to remove aging problems associated with oxidation of Ag contacts, but appears to have no effect on kinetics of Al-Au compound formation. BaO plus HBO2 appears to stabilize Si transistor parameters through 300 C shelf storage. Materials for water vapor partial pressure control at different levels are listed. Rates of oxidation of Si in O and in water vapor as a function of temperature are presented, with crystal face and doping level specified. Studies of dielectric properties of Ph silicate films prepared by accelerated oxidation, studies of accelerated oxidation below 600 C using evaporated Pb, and studies of accelerated oxidation of planar devices are presented. (Author)

AD-273 170 Div. 8
(TISTE/NTM) OTS price $11.50

General Electric Co., Owensboro, Ky.
RESEARCH AND INVESTIGATION ON RADIATION RESISTANT, HIGH TEMPERATURE THERMIONIC CIRCUITRY.
Interim engineering rept. no. 3, 1 Oct-31 Dec 61, by Fred J. Schmidt. 31 Dec 61, 145p. incl. illus. tables.
(Contract AF 33(616)8096)
Unclassified report

DESCRIPTORS: (*Electronic circuits, High temperature research, Thermionic emission, Radiation damage.) (Circuits, *Electron tubes, *Diodes, Triodes, Electrical properties, Mechanical properties, Processing, Materials, Shock resistance, Life expectancy, Titanium.) (*Resistors, *Carbon resistors, Materials, Tungsten, Molybdenum, Life expectancy.) (*Capacitors, Materials, Dielectrics, Ceramic materials, *Variable capacitors, *Mica capacitors.) Test equipment.

Investigations for improvement of grid tensioning methods, development of grid transparency measuring devices, and a better understanding of the problem of low contact potential to the grid electrode were continued. Low capacitance diodes were fabricated with experimental values of capacitance being 58% of conventional TIMM diode capacitance. Shock test and life test data for TIMM diodes and triodes are presented. Investigation of tungsten, platinum, rhodium and carbon resistive films for TIMM resistor application continued. Investigation relating to high temperature conductivity of TIMM ceramic-metal capacitors is progressing. The design of a stacked capacitor utilizing deposited film electrodes is complete. Variable capacitors were fabricated with values ranging from 3.5 to 17.0 picofarads. Inductor test units were designed for investigating conductor winding wire and winding wire insulations. The investigation of a chromium plus nickel electroplate to prevent contamination and embrittlement of titanium at 580 C continued. (Author)

AD-273 171 Div. 8
(TISTE/CAM) OTS price $4.60

General Electric Co., Owensboro, Ky.
A STUDY OF FILMS IN ELECTRON TUBES.
Interim quarterly technical rept. no. 7, 1 Nov 61-16 Feb 62,
by J. W. Hall, II. 16 Feb 62, 42p. incl. illus. tables.
(Contract NObsr-81225)
Unclassified report

DESCRIPTORS: (*Thin films, *Electron tubes, Analysis.) (Films, *Spectrographic analysis, Optical analysis, X-ray spectroscopy, Mass spectroscopy, Theory.) (Diodes, Triodes, Tests, Life expectancy.)

The experimental XD-26H standard diode-triode 1800-hr regular (dc) and standby life test data are presented. A discussion of the theoretical and philosophical aspects of Random Balance experimentation is presented with illustrated examples. (Author)

AD-273 172 Div. 8, 25
(TISTM/BRW) OTS price $3.60

Davison Chemical Co., Baltimore, Md.
REPRODUCIBLE THERMISTOR REFINEMENT PROGRAM.
Interim technical progress rept., 5 Dec 61-4 Mar 62,
by M. C. Vanik, W. T. Barrett and others.
Mar 62, 25p. incl. illus. tables, 2 refs.
(Contract AF 33(657)7104)
(ASD 7-838, vol. 2) Unclassified report

DESCRIPTORS: (Production, Manufacturing methods, *Resistors, *Thermistors, *Semiconductors of Single crystals of *Silicon with Chemical impurities, Gold, Diffusion, Aluminum, Electrodes.) Zone melting.

Reproducibility of Au-doped monocrystalline Si thermistors is dependent upon the nature of the electrode contacts. An Al contact process was developed which resulted in excellent reproducibility. A statistical study comparing float zone-leveled with diffused Au-doped thermistor Si indicated that the float zone-leveling process produces the least variable product. Measuring technique was improved. Resistance measurements are being made primarily by the comparison or ratio technique. The reading is a ratio of the resistance of an unknown to a standard thermistor. This technique improved measurement precision and eliminated effects due to temperature fluctuations in the measurement baths. Ni contacts were high in resistance and non ohmic in behavior. A technique of producing Al contacts was established. These contacts were low in resistance and ohmic. A 13-step manufacturing process was outlined. It assumes the usage of float zone-leveled Si and Al contacts. A dip soldering process was developed. Room temperature vulcanizing silicone rubbers seem satisfactory as final coating materials. (Author)

AD-273 237 Div. 8, 5, 6
(TISTA/WAW) OTS price $6.60

Lincoln Lab., Mass. Inst. of Tech., Lexington.
DYNAMIC BUCKLING OF SPACE FRAME RADOME MODELS,
by R. A. Muldoon. 15 Feb 62, 55p. incl. illus. tables, 15 refs. (Rept. no. 716-3)
(Contract AF 19(604)7400; In cooperation with Bell Telephone Labs.)
(AFESD TDR 62-63) Unclassified report

DESCRIPTORS: (Radar equipment, Communication systems, *Radomes, Beams, Steel, Glass textiles, *Atomic bomb damage, Blast, Elasticity, Buckling, Deformation, Mathematical analysis, Differential equations, Model tests in Shock tubes.)

The design of space frame radome structures to resist dynamic effects of a nuclear blast was investigated. The nuclear blast wave was simulated by a primacord detonation within a 6-ft diameter shock tube which imposes on the space frame model the essential dynamic characteristics of a nuclear blast. Thirty-eight model radomes representing 8 space-frame designs were exposed to shock overpressures in the range of 2-25 psi until model failure resulted. All models failed as a result of a breathing-mode, buckling type failure. By means of the static buckling equation and an equivalent shell analysis, the critical reflected overpressure at normal incidence at which dynamic buckling is initiated is expressed as a function of the space frame parameters and an empirical coefficient. The critical reflected overpressure data was incorporated into the resulting relationship, and the dynamic buckling coefficient determined for each model. The dynamic buckling coefficient was constant over the range of model parameters and test pressures. The blast loading and model response indicate that a linearly scaled prototype will perform in essentially the same fashion as the model. (Author)

AD-273 239 Div. 8, 15
(TISTP/MFA) OTS price $1.10

Lincoln Lab., Mass. Inst. of Tech., Lexington.
INSTANTANEOUS SPECTRA AND AMBIGUITY FUNCTIONS,
by Morris J. Levin. 2 Mar 62, 9p. incl. illus. 5 refs. (Rept. no. 34G-5)
(Contract AF 19(604)7400)
(AFESD TDR 62-62) Unclassified report

DESCRIPTORS: (*Information theory, Functions, Fourier analysis, Integral transforms, *Radio-frequency power, Probability, Radio signals.)

The definition of the instantaneous spectrum of a waveform introduced by C. H. Page (J. Applied Physics 23:103-106, 1952) is modified to take into account past and future values of the waveform symmetrically and is extended to complex signals. The resulting function is the double Fourier transform of the ambiguity function and has other interesting properties. (Author)

AD-273 243 Div. 8, 15
(TISTP/TL) OTS price $2.60

Lincoln Lab., Mass. Inst. of Tech., Lexington.
THE COVARIANCE FUNCTIONS OF SINE AND COSINE PROCESSES,
by J. W. McGinn, Jr. 26 Feb 62, 22p. 7 refs.
(Rept. no. 47G-4)
(Contract AF 19(604)7400)
(AFESD TDR 62-58) Unclassified report

DESCRIPTORS: (*Communications theory, *Statistical processes, *Statistical functions, Mathematical analysis, Transformations (Mathematics), *Fourier analysis, *Series.) (*Radiometers, Calibration, Circuits, Signal-to-noise ratio.)

AD-273 245 Div. 8
(TISTP/TL) OTS price $1.60

Microwave Lab., Stanford U., Calif.
THEORETICAL CONSIDERATIONS ON MILLIMETER WAVE GENERATION BY OPTICAL FREQUENCY MIXING,
by Jorge R. Fontana and Richard H. Pantell.
Jan 62, 13p. incl. illus. 2 refs. (ML rept. no. 887)
(Contract Nonr-22548, Proj. NR 373-361)
Unclassified report

DESCRIPTORS: (*Microwaves, Microwave frequency, *Theory, *Optics, Frequency, *Masers, Infrared radiation.) Materials.

The generation of radiation by mixing optical maser signals is one possible method for closing the gap between microwaves and infrared. The conversion efficiency attainable with different types of nonlinear media is considered. It is shown that lossless nonlinear media, such as dielectrics, have very low conversion efficiency properties, regardless of the way they are used. Nonlinear resistive media, on the other hand, have efficiencies up to 25%, independently of the frequency conversion ratio. Consequently, to generate wavelengths in the millimeter range by mixing optical maser outputs, the materials used should involve nonlinear dissipative processes. (Author)

AD-273 257 Div. 8, 2
(TISTP/WH) OTS price $8.10

Naval Research Lab., Washington, D. C.
MICROWAVE PROPAGATION MEASUREMENTS OVER THE PACIFIC OCEAN, 1946,
by W. S. Ament, W. Binnian and others. 2 Feb 62, 78p. incl. illus. tables, 14 refs. (NRL rept. 5687)
Unclassified report

DESCRIPTORS: (*Microwaves, *Propagation, *Scattering, Pacific Ocean.) (X band, S band.)

Data pertaining to long-range propagation in trade-wind conditions are presented. In 1945, a PBM aircraft was specially instrumented with calibrated S-, X-, and K-band radars for the purpose of measuring the echoes (radar return) from ships and the echoes from rainfall and clouds. The aircraft carried meteorological equipment for measuring atmospheric refractive index. Radar runs were made against thunder-clouds and clouds in the vicinity of the Philippines and against ship targets off Okinawa and Hawaii. Preliminary results of the analysis of the measurements were first reported in 1947 and 1948. The analyses continued in direction s shifting with increased understanding of the scatter mechanism and of the effect of antenna foreground on signal behavior, the cream of the results being published in 1950 and again in 1956. Result of airborne investigations during 1956 confirmed evidence that conditions at elevated trade-wind inversion are responsible for long-range scatter signals. Continuing investigations of ducting and scatter by trade-wind inversions have shown them capable of supporting 200- to 500-Mc signals to 1000 or more miles with reliability, or at least with meteorological predictability. (Author)

AD-273 270 Div. 8, 26
(TISTE/NTM) OTS price $3.00

Radio Corp. of America, Somerville, N. J.
PRODUCTION ENGINEERING MEASURE ON 70mc, 1 WATT SILICON TRANSISTORS.
Final rept., 6 June 59-28 Feb 62,
by F. Katnack and W. J. Freeman, III.
28 Feb 62, 1v. incl. illus. tables.
(Contract DA 36-039-sc-81285)
Unclassified report

DESCRIPTORS: (*Transistors, Silicon, Dioxides, Silicon compounds, Diffusion, Very high frequency, *Manufacturing methods, Production.) (Containers, Gold plating, Climatic factors, Processing.)

A high frequency, silicon transistor capable of 1 watt power output at 70 mc was developed and put into pilot production to demonstrate manufacturability. The device as originally designed was a mesa transistor with a 3 stripe configuration. However, this device did not completely satisfy the environmental specifications and was subsequently changed to a silicon dioxide passivated planar type. A description of the diffusion, assembly and testing of the device is presented in detail so that a minumum amount of effort will be required to put the transistor into mass production. Detailed process specifications are given as are engineering drawings of all parts. This information will serve as the basis for establishing a mass production facility for manufacturing silicon transistors that are capable of producing 1 watt power output at 70 mc with a high degree of reliability. (Author)

AD-273 272 Div. 8, 30
(TISTE/CDM) OTS price $7.60

Airborne Instruments Lab., Inc., Deer Park, Long Island, N. Y.
NEW METHODS FOR MEASURING SPURIOUS EMISSIONS.
Quarterly progress rept. no. 2,
by J. Goldberg, O. F. Hinckelmann and others.
Nov 61, 73p. incl. illus. 9 refs. (Rept. no. 1112-I-2)
(Contract AF 30(602)2511, Proj. 1112)
(RADC TDR 62-98) Unclassified report

DESCRIPTORS: (*Radar transmitters, *Radio transmitters, Microwave frequency, *Radio-frequency power, Measurement by *Wavemeters, *Microwave probes in Waveguides, Antenna horns.) (*Electromagnetic waves, Test equipment, Wave characteristics, *Microwaves, Electric fields, Transmission lines, Tests, Mathematical analysis.)

Investigations continued of new methods for measuring the power of spurious emissions from microwave transmitters. Three methods are being investigated--the fixed-probe method, the movable-probe method, and the free-space method. The fixed-probe breadboard was designed to measure spurious emissions of a transmitter whose fundamental frequency is in the 2.7 to 2.9 kmc range. Power measurements were made with several propagating modes at 4.3 and 7.0 kmc with an accuracy better than ±1 db. High-power tests up to 2 mw gave no indication of breakdown. In the movable-probe method, an accuracy of ±0.5 db was achieved for power measurements at 4.3 kmc. The problem of achieving sufficient probe directivity was solved with a dipole probe whose transmission line is parallel to the direction of propagation. Three approaches to the free-space measurement method were investigated: a single scanning probe, multiple stationary probes, and a single rotating scatterer. Only the single scanning probe is capable of meeting both the sensitivity and accuracy requirements. (Author)

AD-273 317 Div. 8
(TISTP/WH) OTS price $2.60

Norwegian Defence Research Establishment.
LOSSLESS, RECIPROCAL TRANSFORMATIONS OF LINEAR PASSIVE NETWORKS,
by Tor Schaug-Pettersen. 17 Oct 61, 20p. 5 refs.
(Technical note no. 2)
(Contract AF 61(052)484)
(AFCRL 62-131) Unclassified report

DESCRIPTORS: (*Electrical networks, Linear systems, Theory, Impedance.) Matrix algebra.

Lossless, reciprocal transformations of passive impedance matrices are studied. A canonic form is obtained which is equivalent to an array of disconnected two-ports and one-ports. A complete set of invariants is found. (Author)

AD-273 336 Div. 8
(TISTE/CDM) OTS price $2.60

Westinghouse Electric Corp., Baltimore, Md.
PHOTOGENERATOR POWER CONVERSION STUDY.
Interim rept. no. 1, Dec 61-Feb 62,
by I. Limansky, E. F. Wood, and A. S. Jensen.
Feb 62, 27p. incl. illus. tables.
(Contract AF 33(657)7865, Continuation of Contract AF 33(616)7910)
Unclassified report

DESCRIPTORS: (*Phototubes, *Solar cells, Solar energy, *Power transformers, *Generators, Design, Production, Manufacturing methods.) (Electron tubes, Cathodes (Electron tubes), Photosensitivity, Photoemission, Anodes (Electron tubes), Glass, Insulating materials, Vacuum seals, Processing, Cleaning, Test methods.)

Ways and means of constructing developmental models of a close-spaced, thin, solar power converter using the photoemissive principle were investigated. The report discusses the merits of several designs; the equipment and techniques available to fabricate, process and test these devices; and anticipated problems. In particular, the criticalness of the in-vacuum sealing is treated and a sealing fixture, wherein different sealing methods may be tested reproducibly, is described. A demountable process tube is described and compared with the WX-4220, an early process control tube. Chemical processing and vacuum processing techniques and problems are discussed. Using these processes, several component parts for the design were constructed. (Author)

AD-273 415 Div. 8, 25
(TISTE/CDM) OTS price $5.60

Electrical Engineering Research Lab., U. of Illinois, Urbana.
GENERATION OF COHERENT ELECTROMAGNETIC SIGNAL IN THE LOW AND SUBMILLIMETER RANGE,
by Basil W. Hakki. Dec 61, 50p. incl. illus. 9 refs. (Technical note no. 2)
(Contract AF 33(616)7043)
(ASD TDR 62-39) Unclassified report

DESCRIPTORS: (*Radiofrequency generators, *Microwaves, *Electromagnetic waves, Microwave frequency, Wave transmission.) (Electron beams, *Frequency multipliers, Frequency shift, *Cerenkov radiation, *Bremsstrahlung.) Electrons, Plasma physics, Dielectrics, Waveguides.

A study was made of 3 ways of generating coherent electromagnetic energy in the low and submillimeter region. A doppler frequency shift device used a megavolt tightly bunched beam as a moving reflecting surface from which 3 kmc power was reflected. The theoretical magnification in frequency is 27.6 times. The second scheme is that of Cerenkov radiation of a prebunched beam in a plasma column waveguide. No backward wave interaction is possible under any circumstances for the geometry used. Furthermore, the prohibitively high plasma density necessary for operation below one millimeter precludes the use of this device in the submillimeter region. In the third scheme, coherent inner-bremsstrahlung radiation was produced in the millimeter region at power levels in excess of 100 mw by the use of a tightly bunched relativistic electron beam. The inner-bremsstrahlung scheme used is free of physical size limitations, mode interference problems and attenuation difficulties which limit the utility of other schemes in the low and submillimeter region. Thus the only frequency limitation is the size of the bunches of the beam. (Author)

AD-273 416 Div. 8
(TISTP/TL) OTS price $1.60

Electrical Engineering Research Lab., U. of Illinois, Urbana.
STUDIES IN TRANSISTOR-RC NETWORK SYNTHESIS.
Final rept., 1 Dec 56-30 Nov 61,
by M. E. Valkenburg. 30 Nov 61, 16p.
(Contract AF 49(638)63, Proj. 47501)
(AFOSR-2250) Unclassified report

DESCRIPTORS: (*Electrical networks, Synthesis, *Switching circuits, *Programming, *Transistors, Diodes, Feedback, Linear systems.) (*Polynomials, Least squares method, Series, Probability, Tables, Experimental data.)

Research was carried out in five major areas as follows: (1) Active Network Synthesis; (2) Sensitivity; (3) Approximation of a Prescribed Function in the Frequency Domain; (4) Synthesis of Time-Varying Linear Systems; and (5) Switching Circuits, Linear Programming, Probabilistic Graphs. The use of such active devices as transistors, negative impedance converters, gyrators and tunnel diodes were assumed in the synthesis of active networks. Several criteria of sensitivity were investigated. (Author)

AD-273 424 Div. 8, 14, 26
(TISTM/EJH) OTS price $1.60

Cornell-Dubilier Electric Corp., New Bedford, Mass.
PEM FOR PRODUCTION OF FLUORINATED BARIUM TITANATE CAPACITORS FOR OPERATION TO 200 C.
Quarterly rept. no. 3 for period ending 27 Jan 62,
by L. E. Nordquist. 27 Jan 62, 16p. incl. illus. tables.
(Contract DA 36-039-sc-85955)
Unclassified report

DESCRIPTORS: (*Capacitors, *Ceramic capacitors, Materials, *Dielectrics, *Barium compounds, Calcium compounds, *Titanates, Fluorination, High temperature research, Encapsulation, Manufacturing methods, Industrial production, Dielectric properties.)

Binary and high K compositions are being life tested at 200 C and 500 v in both the fluorinated and non-fluorinated condition. The marked improvement of the fluorinated dielectrics over those not fluorinated is reflected in life time, aging rates and insulation resistance. The use of indicator discs to monitor fluoride level within the kiln can be effective if a narrow fluoride range is required; however, careful selection of the composition to be fluorinated can provide a sufficiently broad fluorination range to make their use unnecessary. Bulk fluorination of large quantities of capacitor discs was only moderately successful. Improvements to the technique are being implemented. Encapsulation and assembly problems present a major difficulty. It appears that the dielectric can be improved to withstand the rigors of 200 C operation, but the problems encountered in assembly and encapsulation might require a more involved solution. (Author)

AD-273 439 Div. 8
(TISTE/CAM) OTS price $3.60

Radio Corp. of America, Somerville, N. J.
PRODUCTION ENGINEERING MEASURE ON 300 WATT SILICON AUDIO TRANSISTOR.

Quarterly rept. no. 2, 1 Oct-31 Dec 61,
by S. Silverstein, Z. Chang, ed. by L. T. McCloskey. 31 Dec 61, 25p. incl. illus. tables.
(Contract DA 36-039-sc-85968)
Unclassified report

DESCRIPTORS: (*Transistors, Silicon, Electrical properties, Mechanical properties, Resistance, Temperature, *Manufacturing methods, Processing, Packaging, Production, Diffusion.)

Efforts were continued on the establishment of an industrial capability to manufacture a 300 watt silicon transistor. Processes and technology were transferred from the laboratory to the model shop. Revision of the processes, designed to increase device line productivity, was initiated. Diffusion calculations regarding time and temperature were reduced to simple graphical form. New photographic plates were received. The use of these increase the number of dice per wafer. Defect analysis techniques were developed. Efforts were made to correct the problems in the mounting area. State-of-the-art samples were fabricated and the electrical data for these are reported. (Author)

AD-273 441 Div. 8
(TISTE/CDM) OTS price $2.60

Sperry Gyroscope Co., Great Neck, N. Y.
SHALLOW DONOR EMISSION CATHODE STUDY.
Quarterly technical rept. no. 3, 25 Oct 61-25 Jan 62,
by J. K. Gorman, J. E. McLinden, and A. Malan.
25 Jan 62, 19p. incl. illus. table, 10 refs.
(Rept. no. NA-8250-8278-3)
(Contract AF 30(602)2495, Proj. 5573)
(RADC TDR 62-77)
Unclassified report

DESCRIPTORS: (*Oxide cathodes, *Cathodes (Electron tubes), Barium compounds, Oxides, Rare earths, Ions, Strontium compounds, Impurities, *Thermionic emission, Work functions, Temperature, Fluorescence, Measurement.) (Diodes, Electron tubes, Photoemission, Test equipment, Design.)

Additional effective work function measurements are reported for barium oxide containing small concentrations of neodymium, erbium and europium ions, pure strontium oxide, and strontium oxide containing europium. In view of these negative results, the special circumstances which would preclude any direct correlation between the effective work function plot and the additive ion are discussed. Certain innovations were made in the experimental technique to improve the reliability of the data. The results of a special study of the relationship between the compositions of the coating bath and electrodeposited sample are also presented. The proposed application of the technique of observing the fluorescence of the samples to determine solubility limits and oxidation state of the additive is discussed. A demountable optical test structure was assembled which will enable the close simulation of the actual cathode environment. (Author)

AD-273 444 Div. 8
(TISTE/CAM) OTS price $4.60

Shockley Transistor Corp., Palo Alto, California.
RESEARCH STUDY OF HIGH-POWER, HIGH-FREQUENCY SOLID STATE OSCILLATORS.
Quarterly progress rept. no. 2, 1 Oct 61-1 Jan 62,
by Robert Scarlett and Kurt Hubner. 1 Jan 62, 32p. illus.
(Contract DA 36-039-sc-87324)
Unclassified report

DESCRIPTORS: (*Radiofrequency oscillators, Silicon, Solids, High frequency, Design, Tests.) (Oscillators, *Oscillator circuits, Switching circuits, Negative resistance circuits, Diodes, Transistors, Manufacturing methods, Gold alloys, Aluminum, Semiconductors, Voltage, Measurement.)

Efforts were made to develop a continuous output sequential oscillator. The performance and limitations of various circuit arrangements employing inductive charging were explored. A pulsed mode of operation was devised to demonstrate the circuit principle while avoiding severe heating problems. A 5-mc 20 diode circuit is presently under construction. Two batches of symmetrical gold-doped four layer diodes of 25 and 200-v switching voltages were evaluated in the push-pull oscillator circuit. A power output of 2 watts at 5-mc and maximum frequency of 7-mc was achieved. Frequencies up to 14-mc at a few milliwatts output were obtained in a negative resistance oscillator circuit. Initial measurements on a pressure contacted, 3-terminal 4-layer device with interdigitalized emitter structure show turn-on time of the order 50 ns. (Author)

9. FLUID MECHANICS

AD-273 037 Div. 9
(TISTP/TL) OTS price $4.60

Arnold Engineering Development Center, Arnold Air Force Station, Tenn.
FURTHER DEVELOPMENT OF CAPACITANCE- AND INDUCTANCE-DRIVEN HOTSHOT TUNNELS,
by J. A. van der Bliek. Mar 62, 36p. incl. illus. tables, 15 refs. (Rept. no. AEDC TDR 62-50)
(Contract AF 40(600)800, Proj. 8952)
Unclassified report

Presented at the Second National Symposium on Hypervelocity Techniques, March 19-20, 1962, University of Denver, Denver, Colorado.

DESCRIPTORS: (*Wind tunnels, Design, Growth, Electric arcs, Materials.) (*Aerodynamics, Fluid flow, Measurement.)

An arc chamber with coaxial electrodes was developed for the inductance-driven 50-Inch Hypervelocity Tunnel (Hotshot 2). Combined with a short-circuit switch, to reduce the discharge time, this configuration resulted in a significant decrease in flow contamination. Force tests in the Mach number range from 16-22 at stagnation temperatures from 3000-4000 K and stagnation pressures from 10,000-20,000 psi were in good agreement with results from other tunnels. An arc-chamber liner material study was carried out in the capacitance-driven Tunnel Hotshot 1. The materials tested included copper, boron nitride, graphite, tungsten, and chrome-plated copper. The heat losses through the arc-chamber walls of Hotshot 1, determined from runs at stagnation temperatures from 3000-9000 K, are presented, and their implications on hotshot tunnel operation are discussed. (Author)

AD-273 051 Div. 9, 1
(TISTA/WAW) OTS price $3.60

Princeton U., N. J.
MODEL STUDIES OF THE FORWARD FLIGHT CHARACTERISTICS OF THE P-GEM,
by M. P. Knowlton and A. F. Wojciechowicz, Jr. Dec 61, 54p. incl. illus. 2 refs. (Rept. no. 581)
(Contract DA 44-177-tc-524)
Unclassified report

DESCRIPTORS: (*Flying platforms, Ground effect, Aerodynamics, Model tests, Wind tunnel models, Lift, Drag, Stability, Stability (Longitudinal), Thrust, Vortices, Loading.)

A wind tunnel investigation was conducted to determine the forward flight characteristics of a 1/12 scale model of the P-GEM. Separate studies were also made of the model with non-blowing wings attached at several locations around its perimeter and also with the addition of a tail. Flight simulation studies were made using a 1/5 scale model of the P-GEM to determine the nature of height decay with weight to momentum thrust ratio and velocity. Additional studies were made to investigate the change in pitch trim and stability with flying height. Smoke studies of the 1/12 scale model were made to investigate the vortex formation and streamline flow at various dynamic to base pressure ratios. (Author)

AD-273 084 Div. 9
(TISTA/WAW) OTS price $2.00

National Aeronautics and Space Administration, Washington, D. C.
A METHOD FOR CALCULATING THE GENERALIZED AERODYNAMIC FORCES ON RECTANGULAR WINGS DEFORMING SYMMETRICALLY IN SUPERSONIC FLIGHT WITH INDICIAL OR SINUSOIDAL TIME DEPENDENCE,
by Reuben Bond, Barbara B. Packard and others. Mar 62, 72p. incl. illus. tables, 13 refs. (Technical note D-1206)
Unclassified report

Also available from NASA, Wash. 25, D. C., as NASA Technical note D-1206.

DESCRIPTORS: (*Wings, Supersonics, Transonics, Aerodynamics, Oscillation, Supersonic flight, Deformation, Elasticity, *Flutter, Gust loads, Vibration, Mathematical analysis, Integral equations, Differential equations, Partial differential equations.)

Indicial and sinusoidal force coefficients are reported in terms of analytical solutions and tabular output samples of digital computer programs. The sinusoidal results are made available primarily for purely sinusoidal problems and for checking the extension of the indicial functions to arbitrary time dependence. Results are given in terms of generalized forces for which the mode shapes and upwash distributions are polynomials in spanwise and chordwise coordinates based on an origin at the center of the leading edge. The results include generalized forces for which modal and/or upwash distributions of odd degree in the spanwise direction have been made symmetrical. These distributions are essential for a general analysis of symmetrical vibration problems. (Author)

AD-273 103 Div. 9, 25, 4
(TISTM/EJH) OTS price $2.60

Cornell Aeronautical Lab., Inc., Buffalo, N. Y.
THE EFFECT OF DISSOCIATION ON THE RATE OF VIBRATIONAL RELAXATION,
by Charles E. Treanor and Paul V. Marrone. Feb 62, 13p. illus. 10 refs. (Rept. no. QM-1626-A-4)
(Contract DA 30-069-ORD-3443)
Unclassified report

DESCRIPTORS: (*Re-entry aerodynamics, *Aerodynamic heating, Gases, *Nitrogen, *Oxygen, Vibration, *Dissociation, Relaxation time, Reaction kinetics, Theory.)

The rate of dissociation behind strong shock waves in N2 and O2 is calculated using a revised model for the coupling of vibration and dissociation. In previous calculations a model which coupled the rate of dissociation to the degree of vibrational excitation (CVD model) was used. The present model adds to the CVD model the fact that the rate of vibrational excitation is in part determined by the rate of dissociation. Since the average energy of molecules which are dissociated is greater than the average energy of the remaining molecules, this coupling results in a drain on the average vibrational energy. It is shown that this coupling reduces the strong overshoot in vibrational energy that was previously obtained, and decreases the rate of dissociation behind strong shocks. (Author)

AD-273 110 Div. 9, 12
(TISTP/TL) OTS price $7.60

Rome U. (Italy).
AN EXACT SIMILARITY LAW AND A METHOD OF INTEGRATION FOR RE-ENTRY TRAJECTORIES,
by Luigi Broglio. Sep 61, 73p. incl. illus. 6 refs. (Technical note no. 4; SIARgraph no. 61)
(Contract AF 61(052)198)
(AFOSR-2109) Unclassified report

DESCRIPTORS: (*Re-entry vehicles, Atmosphere entry, *Orbital flight paths, *Re-entry aerodynamics, *Transonics, Lift, Drag.) (Perturbation theory, Integration.)

A method for solving re-entry trajectories is presented. Elimination of ballistic parameter yields similar solutions. Similarity is shown to hold also for other significant quantities. Practical results are shown. Comparison with other methods is made. (Author)

AD-273 200 Div. 9, 10, 27
(TISTP/FR) OTS price $3.60

Arnold Engineering Development Center, Arnold Air Force Station, Tenn.
EXPERIMENTAL STUDIES ON VACUUM CRYOSORPTION PUMPING,
by Andrew E. Lennert. Mar 62, 34p. incl. illus. 8 refs. (Rept. no. AEDC TDR 62-45)
(Contract AF 40(600)800)
Unclassified report

DESCRIPTORS: (Rockets, *Exhaust gases, Nitrogen, *Adsorption, Activated carbon, Vacuum apparatus.) Cryogenics.

A series of experiments was performed in a vacuum to determine the rates of cryosorption of activated charcoal (Matheson 6-14 mesh and 1/8 in. Columbia pellets) and 13-X Linde molecular sieve for bone dry nitrogen and simulated rocket engine exhaust gases. The purpose was to obtain sufficient information to design a cryosorption pumping system for the removal of rocket engine exhaust gases in a high altitude, simulation chamber at the Arnold Engineering Development Center. The results indicated that it is possible to cryosorb 0.015 STP cc/sec-sq. cm of bone dry nitrogen with Matheson 6-14 mesh activated charcoal and maintain an effective chamber pressure of 0.05 mm-Hg for 250 sec of flow. The 13-X Linde molecular sieve material exhibited greater cryosorption rates; however, the minimum reactivation process has not been established. An attempt to correlate theory and experiment was successful for the case where the adsorbent surface temperature is greater than the critical gas temperature. (Author)

AD-273 205 Div. 9, 25
(TISTP/TL) OTS price $6.60

Ballistic Research Labs., Aberdeen Proving Ground, Md.
UNSTEADY SPHERICAL FLOW BEHIND A KNOWN SHOCK LINE,
by Ray C. Makino and Ralph E. Shear. Nov 61, 75p. incl. illus. tables, 7 refs. (BRL rept. no. 1154)
(DA Proj. no. 503-04-002)
Unclassified report

DESCRIPTORS: (*Shock waves, *Blast, Spheres, *Turbulent flow, Space charges.) (Hydrodynamics, Equations, Particles, Velocity.) (Piezoelectric gages, Measurement.) (*Numerical analysis, *Integration, Partial differential equations.) Digital computers.

The hydrodynamical equations of unsteady spherical flow are converted into characteristic form and solved numerically by a difference method. The initial-value curve is the shock line obtained by the least-square fit to some compiled shock-front data on spherical Pentolite, of such form as to approach Kirkwood-Brinkley's theoretical asymptotic shock-front decay curve. Results are tabulated on positive sound paths, mass particle paths, and lines of constant distance. (Author)

AD-273 246 Div. 9, 25
(TISTP/WH) OTS price $3.60

Mechanical Technology Inc., Latham, N. Y.
ON THE TIME DEPENDENT EFFECTS OF SELF-ACTING GAS DYNAMIC JOURNAL BEARINGS,
by C. H. T. Pan. 15 Feb 62, 18p. illus. 11 refs. (Rept. no. MTI-62TR1)
(Contract Nonr-373000, Proj. NR 061-131)
Unclassified report

DESCRIPTORS: (*Gas bearings, Compressible flow, *Viscosity, Fluid flow.) (Partial differential equations, Perturbation theory.) (Bearings, *Lubrication.)

Time dependence of the isothermal Reynolds equation can be identified to consist of one part which depends on the initial condition of the fluid film and another part which is related to the motion of the journal. The latter is proposed to be named intrinsic time dependence. The partial differential equation for the intrinsically time dependent problem is of the elliptical type. A perturbation method to solve this equation, based on the assumption of small time dependent effects, is developed. Beginning with the steady state solution, the governing equations for various time dependent orders are developed in succession. The recurrence relation for these equations is established. For the case of a nearly concentric journal undergoing a small translatory motion, closed form solutions are obtained for intrinsic time dependent effects up to the second order. This analysis permits the computation of intrinsically time dependent fluid film forces once and for all, which can then be used for the stability analysis of all steady state rotor motions. (Author)

AD-273 274 Div. 9
(TISTP/TL) OTS price $4.60

Princeton U., N. J.
HEAT TRANSFER IN OSCILLATING FLOW.
Progress rept. no. 3, 1 Oct 60-30 Sep 61,
by R. C. Saunders and David T. Harrje.
15 Dec 61, 42p. incl. illus. tables, 8 refs.
(Aeronautical engineering rept. no. 483-c)
(Contract Nonr-185829)
Unclassified report

DESCRIPTORS: (*Gas flow, Oscillation, *Heat transfer, *Turbulent flow, Duct inlets, Mach number, Pressure, Shock waves.) (Instrumentation, Heaters, Anemometers.)

The purpose of this investigation of heat transfer in oscillating flow is to locate the primary dependencies of the heat transfer and gain some knowledge of the relationships involved. Through the use of a traversing heater section, it is possible to determine the heat transfer and velocity profile over at least a quarter wave length for the seventh longitudinal harmonic and all higher resonant frequencies. The high amplitudes of the pressure waves induced in the duct under resonant conditions produce considerable variation from the simple sinusoidal type standing wave pattern used in organ pipe analysis. The waves are nonlinear and strong. Travelling shocks exist throughout the duct except at the exit. The result is that the internal flow is quite complex, and it is not possible to isolate the effects of the different variables as in the acoustic case. (Author)

AD-273 289 Div. 9
(TISTP/TL) OTS price $8.60

Arnold Engineering Development Center, Arnold Air Force Station, Tenn.
A GENERAL INVESTIGATION OF TWO-STREAM SUPERSONIC DIFFUSERS,
by C. E. Peters and S. Wehofer. Mar 62, 88p. incl. illus. tables, 10 refs. (Rept. no. AEDC TDR 62-22)
(Contract AF 40(600)800, Proj. 6950)
Unclassified report

DESCRIPTORS: (*Supersonic diffusers, *Supersonic wind tunnels, Rockets, *Exhaust gases, Tests, Theory.) (Nitric acid, Methyl hydrazines.) Mach number.

A general theoretical and experimental investigation of supersonic wind tunnel diffusers with a central core of high energy rocket gases is summarized. Emphasis was placed on basic theoretical understanding of observed phenomena rather than on experimental determination of operable diffuser configurations for a particular combination of tunnel parameters. The experimental tunnel-rocket parameters considered are typical of those used during missile base flow testing, with model to test section diameter ratios of approximately one-third. Experimental diffuser performance data were obtained at tunnel Mach numbers 2, 3, and 4 in a small-scale annular nozzle tunnel (8.18-in.-diam test section) with a rocket (130 lbf thrust) using the propellants IRFNA-UDMH. Data were also obtained at tunnel Mach number 3 in a larger (36-in.-diam) tunnel with rockets using the propellants LOX-RP1. Experimental ratios of tunnel airflow to rocket flow varied from 2 to 16. A sudden-expansion configuration was used. One-dimensional theory was found to accurately predict the over-all performance of the two-stream diffuser with area increase.

AD-273 311 Div. 9
(TISTP/TL) OTS price $12.00

James Forrestal Research Center, Princeton U., N. J.
THE MEASUREMENT AND COMPARISON WITH THEORY OF HEAT TRANSFER FROM SIMILAR LAMINAR BOUNDARY LAYERS TO AERODYNAMIC BODIES IN SUPERSONIC AND HYPERSONIC GAS STREAMS,
by Wm. G. Reinecke. Oct 61, 169p. incl. illus. tables, 30 refs. (Rept. no. 569)
(Contract AF 49(638)465, Proj. 9781)
(AFOSR-1591) Unclassified report

DESCRIPTORS: (*Heat transfer from *Laminar boundary layer to *Aerodynamic configurations, Measurement in Gases at Supersonic flow and Hypersonic flow.) (Wind tunnels, Mach number, Tests.)

This analysis describes the experimental measurement of small rates of heat transfer to wind tunnel models from laminar compressible similar boundary layers at supersonic and hypersonic free stream Mach numbers. Wind tunnel models were developed having surface Mach number distributions corresponding to those required by the similar boundary layer solutions of Cohen and Reshotko (AD-53 921). Then a method, using fairly simple equipment, was tested for measuring isothermal heat transfer to cold wind tunnel models with good accuracy and repeatability. Measurements were made of the recovery temperature and heat transfer rates on cold models with similar boundary layers in both favorable and adverse pressure gradients at a free stream Mach number of two. Tests were also conducted at a free stream Mach number of eleven on a hot body having a favorable surface pressure gradient compatible with the similarity requirement. The assumptions of the similarity analysis were fulfilled in varying degrees by the different test configurations. (Author)

AD-273 312 Div. 9, 12
(TISTA/WAW) OTS price $1.25

National Aeronautics and Space Administration, Washington, D. C.
JET EFFECTS ON CYLINDRICAL AFTERBODIES HOUSING SONIC AND SUPERSONIC NOZZLES WHICH EXHAUST AGAINST A SUPERSONIC STREAM AT ANGLES OF ATTACK FROM 90 DEGREES TO 180 DEGREES,
by Lovick O. Hayman, Jr. and Russell W. McDearmon. Mar 62, 49p. incl. illus. table, 15 refs. (NASA Technical note D-1016)
Unclassified report

Also available from NASA, Wash. 25, D. C., as NASA Technical note D-1016.

DESCRIPTORS: (Bodies of revolution, *Cylindrical bodies, Supersonics, Aerodynamics, Exhaust gases, *Jets, Interference, Pressure, Shock waves, Model tests, Wind tunnel models.) (Deceleration, Aerodynamic heating, Drag, Reduction.) (Re-entry vehicles, Hypervelocity vehicles, Guided missiles, Control, Staging.) (Nozzles, Supersonic nozzles.)

Tests were conducted at a free-stream Mach number of 2.91 and at free-stream Reynolds numbers, based on body diameter, of 0.15 and 0.30 times 10 to the 6th power. The range of the ratio of jet total pressure to free-stream static pressure investigated was from jet off to about 400. The data showed that, in general, variation of the ratio of jet total pressure to free-stream static pressure, jet-exit Mach number, and ratio of jet-exit diameter to body diameter had large influences on the body pressures on the windward halves of the afterbodies and negligible influences on the leeward pressures. There was a negligible effect of Reynolds number on the body pressures. The ratio of jet total pressure to free-stream static pressure also had a large influence on the base pressures at all angles of attack. Schlieren studies showed details of the shock-wave structure caused by the jet and the extent of the jet interference flow fields. (Author)

AD-273 316 Div. 9, 12, 25
(TISTA/WAW) OTS price $.50

National Aeronautics and Space Administration, Washington, D. C.
EXPERIMENTAL OBSERVATIONS OF AERODYNAMIC AND HEATING TESTS ON INSULATING HEAT SHIELDS,
by Melvin S. Anderson and C. W. Stroud. Mar 62, 19p. incl. illus. table (Technical note D-1237)
Unclassified report

Also available from NASA, Wash. 25, D. C., as NASA Technical note D-1237.

DESCRIPTORS: (*Re-entry vehicles, Aerodynamic heating, Re-entry aerodynamics, Aerodynamics, Supersonics, Airframes, *Thermal insulation, *Shielding, Countermeasures, Model tests, Windtunnel models.)

Several different types of insulating heat shields were subjected to aerodynamic tests and radiant-heating tests to obtain a better insight into the problems involved when the primary structure of an aerodynamically heated vehicle is substantially cooler than the exposed external surface. One of the main problems was a proper allowance for thermal expansion caused by these large temperature differences, so that undue distortion or thermal stresses would not occur in either the outer shield or the underlying structure. A corrugated outer skin with suitably designed expansion joints was a feature of the specimens tested. (Author)

AD-273 328 Div. 9, 25
(TISTP/MFA) OTS price $8.10

Davidson Lab., Stevens Inst. of Tech., Hoboken, N. J.
HYDROFOIL FLUTTER PHENOMENON AND AIRFOIL FLUTTER THEORY. VOLUME I. DENSITY RATIO,
by Charles J. Henry. Sep 61, 89p. incl. illus. tables, 13 refs. (Rept. no. R-856)
(Contract Nonr-26335)
Unclassified report

DESCRIPTORS: (*Hydrofoils and *Airfoils, *Flutter, Velocity and Frequency.) (Elasticity, Stresses, *Hydrodynamics, Stability, Tests.) (Laboratory equipment, Experimental data, Tables.)

The theoretical procedures commonly used by aeroelasticians were applied to predict the flutter speed of a rigid hydrofoil that had two degrees of freedom. The results, compared with corresponding experimental measurements, indicated a discrepancy between theoretical and experimental flutter speeds at low density ratios; the predicted asymptotic behavior of flutter speeds occurred, but at a lower density-ratio. In addition, the accuracy of the circulation terms is more doubtful than that of the added mass and linear terms in the theory. (Author)

AD-273 332 Div. 9, 1
(TISTA/WAW) OTS price $13.50

Sikorsky Aircraft Div., United Aircraft Corp., Stratford, Conn.
COMPARISON OF THEORETICAL AND EXPERIMENTAL MODEL HELICOPTER ROTOR PERFORMANCE IN FORWARD FLIGHT,
by John P. Rabbott, Jr. July 61, 181p. incl. illus. tables, 12 refs. (Rept. no. SER-50129)
(Contract DA 44-177-tc-548, Proj. 9R38-13-014-02)
(TREC TR 61-103) Unclassified report

DESCRIPTORS: (*Helicopter rotors, *Aerodynamics, Transonics, Compressible flow, Mathematical analysis, Model tests, Wind tunnel models, Vibration, Stresses, Deformation, Elasticity, Lift, Drag, Torque, Power, Stalling, Thrust.)

An analytical and experimental program was conducted to determine the degree of correlation between theoretical and experimental model rotor performance over a range of forward speeds of 100 to 161 knots and tip speeds of 580 to 850 ft./sec. The theory utilized synthesized airfoil data derived from hovering tests, and included both stall and compressibility effects. The model blades were dynamically scaled from the Sikorsky S-56 main rotor blades. Theory and experiment correlate well below the theoretically predicted stall boundary, but above stall the theory is unduly conservative in estimating rotor power required. The effects of compressibility on rotor power loading can be accurately predicted. A rotor with an NACA 0012 airfoil section incurs severe penalties in profile power when the advancing tip Mach number exceeds 0.85 to 0.90. Significant amounts of model rotor blade dynamic twisting (up to 5 degrees change in pitch at the 3/4 radius station) occur both in hovering and in forward flight. Such twisting must be taken into account to properly synthesize airfoil data from hovering tests. (Author)

AD-273 406 Div. 9
(TISTP/TL) OTS price $1.60

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson Air Force Base, Ohio.
FORMATION OF THE FLOW PATH OF A TURBINE BY UNDERCUTTING BLADES OF THE INITIAL STAGE,
by A. M. Zavadovskiy, Kh. L. Babenko and others, 19 Feb 62, 12p. incl. illus. table, 1 ref.
(Trans. no. FTD-TT-61-444 of Energomashinostroyeniye, no. 7:pp. 19-21, 1960)
Unclassified report

DESCRIPTORS: (Aerodynamics, *Fluid flow, *Gas turbines, *Guide vanes, Pitch.) Mathematical analysis, USSR.

The analysis shows that at the present time it is advisable to form and calculate the flow paths of turbines by the method of model stages. This method specifies the formation of the flow path from the inital stage by undercutting the blades for the given operating conditions of a group of stages, and in certain cases, of the entire flow path of an individual turbine cylinder or of the turbine as a whole. (Author)

AD-273 413 Div. 9
(TISTE/NTM) OTS price $1.60

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson Air Force Base, Ohio.
PUMP VIBRATION CAUSED BY CAVITATION,
by G. A. Khoroshev. 20 Feb 62, 15p. incl. illus. table, 4 refs. (Trans. no. FTD-TT-61-179 of Energomasinostroyeniye, no. 4:26-30, Apr 60)
Unclassified report

DESCRIPTORS: (*Fuel pumps, *Centrifugal pumps, *Hydraulic pressure pumps, Vibration, Cavitation, Tests, Test methods, USSR, Measurement, Mathematical analysis.)

Division 10 - FUELS AND COMBUSTION
Division 11 - GROUND TRANSPORTATION EQUIPMENT
Division 12 - GUIDED MISSILES

The problem of pump vibration caused by various stages of cavitation was examined. The influence of the air content of liquid on the intensity and frequency of vibration was established. The relation of the collapsing cavitation to a heavy increase of vibration in the average audiofrequency range is indicated. Measures for the prevention of vibration over the entire audiofrequency range are described. (Author)

10. FUELS AND COMBUSTION

AD-273 012 Div. 10
(TISTP/JW) OTS price $10.50

Rohm and Haas Co., Huntsville, Ala.
THE MODIFIED WAGON WHEEL GRAIN DESIGN W1 EQUALS W2 EQUALS W3, W1 GREATER THAN W3 GREATER THAN W2,
by Max W. Stone. 14 Feb 62, 7p. illus. tables.
(Rept. no. S-33)
(Contract DA 01-021-ORD-11878)
Unclassified report

DESCRIPTORS: (*Propellant grains, *Solid rocket propellants, Design, Configuration.) (Mathematical analysis, Programming, *Tables, Surfaces.)

A modification of the wagon wheel grain design is considered in which short spears or spokes of propellant alternate with longer ones, and in which three different webs give rise to a three-level surface-time history. There are six possible combinations of these webs under the limitation that the outer web must always be equal to or greater than either of the other two. This report discusses the analysis of the two cases where w1 = w2 = w3 and w1 greater than w3 greater than w2. In addition, tabulated data for the two cases are reported. (Author)

AD-273 265 Div. 10, 25
(TISTA/WAW) OTS price $2.60

Rocket Power, Inc., Pasadena, Calif.
THERMODYNAMICS OF REACTIONS INVOLVING LIGHT METAL OXIDES AND PROPELLANT GASES.
Quarterly rept. no. 7, 9 Nov 61-9 Feb 62,
by H. L. Petersen, J. A. Blauer and M. Farber.
9 Feb 62, 17p. incl. illus. tables, 8 refs.
(Rept. no. QR-1987-7)
(Contract DA 04-495-ORD-1987)
Unclassified report

DESCRIPTORS: (*Aluminum compounds, *Oxyfluorides, *Oxides, Fluorides, Heat of formation, Chemical reactions, *Thermochemistry.) (Boron compounds, Boric acids, Chemical reactions, Oxides, Water.) (Solid rocket propellants, Aluminum compounds, Thermodynamics.)

An experiment was performed employing a specially designed high temperature electron bombardment-resistance furnace indicating the formation of AlOF as a result of the reaction between AlF3 and Al2O3. A preliminary heat of formation for AlOF(g) at 298 K of -128 ± 11 kcals/mole was reported. A new apparatus was constructed which will reduce the uncertainty in the preliminary value, and allow measurements leading to definitive values for Hf and S of AlOF. Transpiration experiments concerning the reaction of H2O with B2O3 to yield (HBO2)3 were completed. Results indicate that both the monomer and the trimer of HBO2 exist in equilibrium in the temperature range 1000-1500 K. An independent evaluation of the thermodynamic properties of the monomer HBO2 by a method of effusion was initiated. From the preliminary data obtained, a comparison of the results obtained by effusion and by the molecular flow method was made. (Author)

AD-273 404 Div. 10, 27
(TISTA/WAW) OTS price $1.60

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson Air Force Base, Ohio.
METHODS OF ESTIMATING THE QUALITY OF JET FUELS,
by V. N. Zrelov. 16 Feb 62, 17p. incl. illus. 46 refs. (Trans. no. FTD-TT-62-17 of Khimiya i Tekhnologiya Topliv i Masel, no. 2:pp. 66-70, 1961)
Unclassified report

DESCRIPTORS: (*Jet engine fuels, Combustion, Deposits, Corrosion, Stability, Chemical impurities, Impurities, Test methods, Quality control.) USSR.

11. GROUND TRANSPORTATION EQUIPMENT

No Entries

12. GUIDED MISSILES

AD-273 085 Div. 12, 19
(TISTW/DLW) OTS price $1.25

National Aeronautics and Space Administration, Washington, D. C.
OPTIMAL FILTERING AND LINEAR PREDICTION APPLIED TO A MIDCOURSE NAVIGATION SYSTEM FOR THE CIRCUMLUNAR MISSION,
by John D. McLean, Stanley F. Schmidt, and Leonard A. McGee. Mar 62, 55p. incl. illus. table, 4 refs. (NASA Technical note D-1208)
Unclassified report

Also available from NASA, Wash. 25, D. C., as NASA Technical note D-1208.

DESCRIPTORS: (*Spaceships, Manned, *Space navigation, Space flight, Guidance, Airborne, Navigation computers, Linear systems, *Optical systems, Position finding, Velocity, Flight paths, Mathematical prediction.) (Celestial mechanics, Perturbation theory, Statistical analysis, Errors, Probability.) (Moon, Orbital flight paths, Control systems.)

The safety of a manned circumlunar mission is increased if an on-board midcourse navigation system does not have to rely on tracking information obtained on earth; it is apparent that the use of an optimal filter in such a system should be explored. Details are presented of a possible

on-board navigation system that uses the optimal filter. The performance of the system is evaluated. The guidance system chosen is based on the assumption that the actual trajectory of the space vehicle can be accurately described in terms of linear perturbations about a precalculated standard or reference trajectory. This technique has been used successfully in many problems involving the dynamics of aircraft and, because of its simplicity, could prove useful in space navigation problems. (Author)

AD-273 087 Div. 12
(TISTA/LSK) OTS price $.50

National Aeronautics and Space Administration, Washington, D. C.
PRELIMINARY STUDIES OF MANNED SATELLITES WINGLESS CONFIGURATION: NONLIFTING,
by Maxime A. Faget, Benjamine J. Garland, and James J. Buglia. Mar 62, 16p. incl. illus. table, 9 refs. (Technical note D-1254; Supersedes NACA Research memo. L58E07a, dtd 11 Aug 58, AD-222 350)

Unclassified report

Also available from NASA, Wash. 25, D. C., as NASA Technical note D-1254.

DESCRIPTORS: (Feasibility studies, Manned, *Conical bodies, Blunt bodies, *Satellite vehicles, Re-entry vehicles, Aerodynamic configurations, *Satellite vehicle trajectories, Terminal ballistics, Atmosphere entry, Aerodynamic heating, Re-entry aerodynamics, Dynamics, Deceleration, Acceleration tolerance, Recovery, Mathematical analysis.)

Consideration was given to a simple nonlifting satellite vehicle which follows a ballistic path in re-entering the atmosphere. An attractive feature of such a vehicle is that the research and production experiences of the ballistic-missile programs are applicable to its design and construction, and since it follows a ballistic path, there is a minimum requirement for autopilot, guidance, or control equipment. After comparing the loads that would be attained with man's allowable loads, and after examining the heating and dynamic problems of several specific shapes, it appears that, insofar as reentry and recovery are concerned, the state of the art is sufficiently advanced so that is is possible to proceed confidently with a manned-satellite project based upon the ballistic-reentry type of vehicle. (Author)

AD-273 134 Div. 12, 9
(TISTP/MFA) OTS price $2.60

Lincoln Lab., Mass. Inst. of Tech., Lexington.
THREE DEGREES-OF-FREEDOM TRAJECTORY ANALYSIS PROGRAM,
by Kent Kresa and Peter A. Willmann. 30 Jan 62, 27p. incl. illus. 2 refs. (Rept. no. 312G-5)
(Contract AF 19(604)7400)
(AFESD TR 62-60) Unclassified report

DESCRIPTORS: (*Guided missiles, *Flight paths, Analysis, Aerodynamics, Earth, Gravity.) (Velocity and Acceleration of *Satellite vehicles.) (Heat transfer, Turbulence, Boundary layer.) (Equations of Motion, Transformations (Mathematics).) (Digital computers, Experimental data.)

The translational motion of a multi-stage missile with respect to a non-rotating spherical earth, with a 1/R squared gravitational field and a real atmosphere was programmed for the 7090 high speed digital computer. The program includes the effects of aerodynamic lift and drag, booster thrusting, and spin due to aerodynamic fins and spin rockets. The output from the program includes the trajectory of the vehicle with respect to both inertial space and earth fixed coordinates, the velocity and total acceleration time histories of the vehicle and the laminar and turbulent heat transfer at the vehicle's stagnation and sonic points respectively. In addition the results of a run which simulates the Trailblazer II trajectory are presented. Provisions were made to determine the range, azimuth, elevation and their first and second derivatives for the vehicle from any point in space. Incremental valves during stage separations may also be found. These computations are performed in an auxiliary program entitled Radar Trajectory. (Author)

AD-273 136 Div. 12, 2
(TISTB/LH) OTS price $21.00

Lockheed Aircraft Corp., Sunnyvale, Calif.
ANNOTATED BIBLIOGRAPHY OF LUNAR PROPERTIES, GEOLOGY, VEHICLES, AND BASES. PART III. LUNAR AND ARCTIC EXPLORATION AND HABITATION,
comp. by A. A. Beltran, J. B. Goldmann, and E. E. Graziano. Feb 62, 1v. (Special bibliography no. SB-61-67, pt. 3; Rept. no. 5-53-61-2, pt. 3)

Unclassified report

DESCRIPTORS: (*Bibliography, *Moon.) (Lunar probes, Manned, Spaceships, Closed-cycle ecological systems, Transportation, Extraterrestrial bases, Planets, Arctic regions, Exploration, Geology, Logistics, Frostbite, Satellite vehicles, Space capsules, Permafrost.)

AD-273 150 Div. 12, 29
(TISTW/EET) OTS price $4.60

Reed Research, Inc., Washington, D. C.
STANDARDIZATION POTENTIALS IN DOCUMENTATION AND DESIGN OF GUIDED MISSILE CONTAINERS. A STUDY IN THREE VOLUMES. VOLUME I. PROCEDURES AND DOCUMENTATION.
1 Dec 61, 41p. (Rept. no. RR1544, Vol. 1)
(Contract NOrd-18878)
(NAVWEPS rept. no. 7870, Vol. 1)

Unclassified report

DESCRIPTORS: (Preparation of Standards and Specifications for Design of *Guided missiles, Shipping and Storage, *Containers.) (Guided missiles, Packaging, Military requirements.) (Standardization of Handbooks for Design, Guided missiles, Containers.) (Containers, Shock, Vibration, Maintenance, Test methods, Tests.)

A study was made of documentation procedures for the design, development, packaging and testing of shipping containers for guided missiles. An attempt has been made to standardize specification requirements between the services. Procedures used by the individual services are given, and results of the study are summarized together with recommendations for specific standardization projects.

Division 12 - GUIDED MISSILES

AD-273 151 Div. 12, 29
(TISTW/EET) OTS price $10.10

Reed Research Inc., Washington, D. C.
STANDARDIZATION POTENTIALS IN DOCUMENTATION AND DESIGN OF GUIDED MISSILE CONTAINERS. A STUDY IN THREE VOLUMES. VOLUME II. DESIGN AND TEST CRITERIA.
1 Dec 61, 118p. incl. illus. tables (Rept. no. RR1544, Vol. 2)
(Contract NOrd-18878)
(NAVWEPS rept. no. 7870, Vol. 2)
Unclassified report

DESCRIPTORS: (Design, Standardization for *Guided missiles, Shipping, *Containers.) (Preparation of *Standards and *Specifications for Guided missiles, Containers.) (Containers, Test methods, Test equipment, Tests, Military requirements.) (Specifications for Corrosion, Handling, Vibration, Shock resistance, Tests.)

Possibilities for standardizing design and test criteria for missile containers are discussed. The study has shown wide differences in what is specified, and even where the same thing may be specified, differences in specification reference and the like. Both types of difference cause difficulty to the designer. It was found that there are substantial differences of approach as well as what might be termed administrative differences stemming from the existence of different specification numbers. In each specific area, it was found that standardization is not only possible, but desirable. Comments emphasize the desirability of preparing a single document covering design criteria for guided missile shipping containers and means of measuring the degree to which such criteria have been satisfied. (Author)

AD-273 152 Div. 12, 29
(TISTW/EET) OTS price $5.60

Reed Research, Inc., Washington, D. C.
STANDARDIZATION POTENTIALS IN DOCUMENTATION AND DESIGN OF GUIDED MISSILE CONTAINERS. A STUDY IN THREE VOLUMES. VOLUME III. SUMMARY OF SPECIFIC STANDARDIZATION PROJECTS RECOMMENDED.
1 Dec 61, 49p. (Rept. no. RR1544, Vol. 3)
(Contract NOrd-18878)
(NAVWEPS rept. no. 7870, Vol. 3)
Unclassified report

DESCRIPTORS: (Preparation of Standards and Specifications for Design of *Guided missiles, Shipping and Storage, *Containers.) (Guided missiles, *Packaging, Military requirements.) (Standardization of Handbooks for Design of Guided missiles, Containers.)

Standardization studies are presented for the development of a standard document outlining the design criteria for guided missile shipping containers. Major recommendations and comments of interested Government and contractor activities are discussed.

AD-273 195 Div. 12
(TISTB/CCH) OTS price $3.60

Aerospace Corp., Los Angeles, Calif.
BIBLIOGRAPHY OF REPORTS PREPARED UNDER CONTRACT AF 04(647)594 (PERIOD ENDING 31 DECEMBER 1961),
comp. by Barbara H. Tripoli. 22 Jan 62, 33p. incl. illus. (Rept. no. CSR-594(1990)BR-1, supersedes CSR-594-BR-1, AD-251 546, CSR-594-BR-1, suppl. 1, AD-256 317)
(Contract AF 04(647)594)
Unclassified report

DESCRIPTORS: (*Bibliography, *Guided missiles, *Guided missile research, Power supplies, Propulsion, Electronics, Radiation damage, Energy.) (Maintenance, Manned.)

AD-273 255 Div. 12, 25, 9
(TISTA/WAW) OTS price $1.00

National Aeronautics and Space Administration, Washington, D. C.
METHODS FOR DETERMINING THE OPTIMUM DESIGN OF STRUCTURES PROTECTED FROM AERODYNAMIC HEATING AND APPLICATION TO TYPICAL BOOST-GLIDE OR REENTRY FLIGHT PATHS,
by Robert S. Harris, Jr., and John R. Davidson. Mar 62, 37p. incl. illus. 4 refs. (Technical note D-990)
Unclassified report

Also available from NASA, Wash. 25, D. C., as NASA Technical note D-990.

DESCRIPTORS: (Re-entry vehicles, *Hypervelocity vehicles, Re-entry aerodynamics, *Aerodynamic heating, Airframes, Structures.) (Airframes with Thermal insulation or Cooling, Design, Stresses, Load distribution, Deformation, Buckling.) (Heat transfer, Mathematical analysis.)

General equations are developed for the design of efficient structures protected from thermal environments typical of those encountered in boost-glide or atmospheric-reentry conditions. The method is applied to insulated heat-sink stressed-skin structures and to internally cooled insulated structures. Plates loaded in compression are treated in detail. Under limited conditions of plate buckling, high loading, and short flight periods, and for aluminum structures only, the weights of both configurations are nearly equal. Load parameters are found and are similar to those derived in previous investigations for the restricted case of a constant equilibrium temperature at the outside surface of the insulation. (Author)

AD-273 329 Div. 12
(TISTA/WAW) OTS price $6.60

RAND Corp., Santa Monica, Calif.
SOME METHODS FOR ESTABLISHING INTERPLANETARY TRANSFER ORBITS,
by L. N. Rowell. Mar 62, 63p. 3 refs. (Memo. no. RM-2881-PR)
(Contract AF 49(638)700, Proj. RAND)
Unclassified report

DESCRIPTORS: (*Space flight, Dynamics, *Orbital flight paths, Digital computers, Mathematical analysis, Differential equations, Integral equations, Partial differential equations.) (Equations of Motion, Operations research.)

Some methods for establishing heliocentric interplanetary transfer orbits are discussed. The four basic methods and their variations can be

used to establish orbits having specified transfer angles, transfer times, hyperbolic excess velocities, or heliocentric departure velocities. Each method consists of a step-by-step computation procedure which utilizes the equations of two-body motion and appropriate trigonometric relations to establish the desired transfer orbit. Each method for establishing a desired transfer orbit requires an iterative process. Thus, the methods are best applied by using a large-scale digital computer. In this way numerous orbits can be established and the orbit which is optimum for some requirement can be selected. None of the methods permits a direct analytical determination of an optimum orbit. (Author)

AD-273 334 Div. 12
(TISTA/WAW) OTS price $6.00

Northrop Corp., Hawthorne, Calif.
STRUCTURAL VIBRATIONS IN SPACE VEHICLES.
Rept. on Dynamic Problems in Flight Vehicles for Jan 61,
by K. Eldred, William Roberts, and R. White.
Dec 61, 457p. incl. illus. tables, 39 refs.
(Contract AF 33(616)6486, Proj. 1370; In cooperation with Western Electro-Acoustic Lab., Inc., Los Angeles, Calif.)
(WADD TR 61-62) Unclassified report

DESCRIPTORS: (*Satellite vehicles, *Guided missiles, *Booster rockets, Dynamics, *Vibration, Fatigue (Mechanics), Airframes, Structures.) (Vibration from Rocket motor noise, Exhaust gases, Turbulent boundary layer, Oscillation of Shock waves, Flutter, Turbulence of Atmosphere, Wind, Meteorites, Combustion of Rocket motors.) (Vibration, Fatigue (Mechanics). Mathematical analysis, Integral equations, Analysis, Test methods, Experimental data.) Aerodynamics, Ground effect.

Study was made of forcing functions and their characteristics, methods of estimating a combined response, and proof tests required to qualify structure and equipment. The report is presented in three parts. Part One discusses the various sources of vibratory energy which can result in vehicle vibration including rocket noise, aerodynamic pressure fluctuations, wind shear and gust, meterorites and direct mechanical coupling. Part Two discusses the prediction of vibratory response through both empirical and analytical approaches, and includes a thorough discussion of the single degree of freedom system, resonance-on-resonance, panels, shells, mobility, generalized force, joint acceptance, correlations and other statistical tools. Part Three contains a discussion of fatigue and malfunction, the properties of an ideal test, implications of and methods for obtaining a simplified composite response and an examination of various test equivalences. (Author)

AD-273 435 Div. 12, 6, 27, 10
(TISTP/TL) OTS price $8.60

Boeing Co., Seattle, Wash.
LABORATORY STUDIES OF ROCKET PLUME RADIATION AT REDUCED PRESSURE.
Final rept.,
by J. W. Sutton. Dec 61, 84p. incl. illus. 4 refs.
(Contract AF 19(604)7439, Proj. 5043)
(AFCRL 62-235) Unclassified report

DESCRIPTORS: (*Rocket motors, *Exhaust gases, *Exhaust flames, Detection, *Wind tunnels, *Tests, Infrared radiation, Spectrographic analysis, Measurement.) (Altitude chambers, Simulation.) (Instrumentation, Radiometers, Spectrophotometers.) (Experimental data, Tables.) (Liquid rocket propellants, Solid rocket propellants.)

Laboratory studies were conducted about the spatial and spectral distribution of rocket plume radiance at simulated altitudes. Motors of 150 to 200 lb thrust were operated at sea level and at pressures equivalent to approximately 50,000 and 100,000 ft. The propellant combinations studied were gasoline/oxygen, RP 1/oxygen, JP 4/oxygen, UDMH/N2O4 and aluminized solid propellant. A traversing rocket technique was employed which permitted simultaneous observation of a number of radiometric and spectrometric properties of a common area of the plume. The graphical presentations of these data are interpreted on a qualitative and semi-quantitative basis. (Author)

13. INSTALLATIONS AND CONSTRUCTION

AD-273 202 Div. 13
(TISTE/NTM) OTS price $12.00

Army Engineer Research and Development Labs., Fort Belvoir, Va.
PROTECTIVE CONSTRUCTION BY PROVED COMPONENTS,
by Ralph H. Sievers, Jr. 21 Aug 61, 157p. incl. illus. tables (Technical rept. no. 1689-TR)
(Project 8S12-95-001)
Unclassified report

DESCRIPTORS: (*Protective coverings, *Shelters, Portable shelters, *Construction, Structures, Design.) (Military engineering, Structures, Materials, Blast, Resistance, Nuclear explosions, Atomic bomb explosions, Nuclear weapons, Radiological contamination, Radiation effects, Effectiveness, Tests.)

A system is presented for protective construction by proved components. The development of concepts of design, actual designs and tables for material selections, and schemes for use of proved utilities together with requirements for such utilities based on structure utilization are covered. The system is based on results of past nuclear weapons tests, high explosive tests, and nondestructive test programs. It is concluded that: (a) results of nuclear weapons effects tests are of sufficient scope and quality that a system of field protective construction is feasible; (b) the system of design presented allows a field engineer not trained in nuclear weapons effects to apply the results of nuclear tests to satisfy the requirements for protective structures; and (c) protective structures may be designed as an assembly of independent components reacting to blast or shock loadings in such a manner that the reaction of one does not weaken the resistance of another. (Author)

AD-273 229 Div. 13
(TISTE/CAM) OTS price $3.60

Iowa State U. of Science and Tech., Ames.
USE OF MODELS TO SIMULATE BEHAVIOR OF UNDERGROUND

STRUCTURES SUBJECTED TO BLAST LOADINGS.
Final rept. on A Study of the Use of Models to Simulate Dynamically Loaded Underground Structures,
by Glenn Murphy and D. F. Young. Jan 62, 31p. incl. illus. tables, 13 refs.
(Contract AF 29(601)4375, Proj. 1080)
(AFSWC TDR 62-2) Unclassified report

DESCRIPTORS: (*Underground structures, *Soils, *Earth models, Blast, Load distribution, Pressure, Stresses, Simulation, Impact shock, Mathematical analysis, Model tests.)

Results are presented of an analytical investigation of the use of models to simulate dynamically loaded structures buried under the ground. Scaling laws were proposed that were assumed to relate a model structure and soil medium to its corresponding prototype components. As an initial step in verifying the proposed scaling laws, small structural models were embedded in a soil sample at various depths and impact loads were applied by means of a falling weight. (Author)

AD-273 306 Div. 13, 25
(TISTP/WH) OTS price $4.60

Lockheed Aircraft Corp., Sunnyvale, Calif.
MEMBRANE ANALYSIS OF ORTHOTROPIC FILAMENT-WOUND PRESSURE VESSELS,
by R. F. Hartung. Feb 62, 47p. incl. illus. 13 refs. (Rept. no. 3-80-62-1)
(Contract NOrd-17017)
Unclassified report

DESCRIPTORS: (*Structures, Membranes, *Pressure vessels.) (Membranes, Filaments.) (Load distribution, *Structural shells, Tensile properties, Mathematical analysis.) Stresses.

A system of equations suitable for analyzing membrane stresses in orthotropic single-pair filament-wound pressure vessels is presented. This system of equations is used to determine the real significance of two special classes of vessels, (1) isotensoid (uniform filament stress), and (2) balanced design (resin strength negligible). The so-called geodesic dome is shown to possess the unique contour and filament pattern for an isotensoid single-pair filament-wound structure. Planar-wound vessels are studied in detail and two examples are discussed. The first is concerned with the shape of the balanced design dome. The second is concerned with planar-wound vessels of arbitrary contour; and the stresses in a pressure vessel, consisting of a cylinder with dome end closures, are analyzed. (Author)

14. MATERIALS (NON-METALLIC)

AD-273 035 Div. 14, 1
(TISTM/BRW) OTS price $1.50

Nonmetallic Materials Lab., Aeronautical Systems Div., Wright-Patterson Air Force Base, Ohio.
FIRE RESISTANT MATERIALS FOR PERSONNEL PARACHUTE PACKS.
Rept. for Oct 56-Mar 61 on Fibrous Materials for Decelerators and Structures,
by Clarence O. Little, Jr. and Jack H. Ross. Dec 61, 38p. incl. illus. tables.
(Proj. 7320)
(ASD TR 61-515) Unclassified report

DESCRIPTORS: (*Parachutes, Parachute fabrics, Protective coverings, *Fire resistant textiles, Synthetic fibers, Heat resistant polymers, Effectiveness.) (Tests, Test methods, Aircraft fires, Simulation.)

Escape from burning aircraft has been extremely uncertain because of intense heat damage to personnel parachutes. The ability of various heat resistant materials to withstand 1200 F for 10 to 12 sec was investigated along with their weights, strengths, abrasion resistance, and ease of fabrication. After several unsatisfactory tests of available materials, a solution to the problem seemed to depend on a breakthrough in synthetic fibers. In fire tests of a new experimental temperature resistant polymeric fiber, HT-1, the outer layer of HT-1 was burned or charred away, but the inner layer was completely intact. The nylon canopy had 2 small fused spots, no darkened areas, and no damage to the suspension lines, and was satisfactorily drop tested twice since the fire test. (Author)

AD-273 047 Div. 14
(TISTM/BRW) OTS price $1.60

Feltman Research Labs., Picatinny Arsenal, Dover, N. J.
WAYS OF OBTAINING SUPER-STRONG UNBREAKABLE GLASS,
by M. A. Beyborodov and A. M. Kripskiy. Mar 62, 14p. incl. table (Technical notes FRL TN 101; Trans. from Vestnik Akademii Nauk SSSR 1:65-69, Jan 61)
Unclassified report

DESCRIPTORS: (*Glass, Processing, Tensile properties, *Brittle materials, Surface properties.) (Pickling, Heat treatment, Pressure, Cooling, Degasification, Radiation effects, Gamma rays, Ultrasonics, Sound.) USSR.

An important shortcoming of glass is its low tensile strength with consequent brittleness and low heat resistance. Coefficients of brittleness (the reciprocal of maximum relative deformation) are given for glass and several other materials. The elimination of micro-defects may increase tensile strength a hundred times. Some ways to remove defects are: pickling in HF to remove surface cracks; heating in a vacuum at high temperature to remove gases; cooling under great pressure to prevent micro-cracks; and gamma irradiation during melting and cooling to prevent crystallization. Tensile strength may be increased by forced polymerization induced by powerful sonic or ultrasonic waves. (Author)

AD-273 065 Div. 14, 17
(TISTM/BRW) OTS price $12.50

General Dynamics/Astronautics, San Diego, Calif.
COMPILATION OF MATERIALS RESEARCH DATA.
Quarterly progress rept. no. 4 on Phase 1, 1 Dec 61-1 Feb 62,
by P. Bergstedt. Mar 62, 1v. incl. illus. tables, refs. (Rept. no. AE 62-0138-3)
(Contract AF 33(616)7984)
Unclassified report

DESCRIPTORS: (*Alloys, *Metals, *Plastics, Expanded plastics, *Glass textiles, Laminates, Sheets, Metal plates, Titanium, *Titanium alloys, *Aluminum alloys, *Stainless steel, *Steel, *Nickel alloys.) (Low temperature research, Cryogenics, Mechanical properties, Physical properties, Fatigue (Mechanics), Corrosion.) (Martensite, X-ray diffraction analysis.) (Thermal expansion, Measurement.)

A progress report is presented in the form of a collection of 12 internal reports generated on materials investigations. The individual reports are submitted in their entirety rather than in condensed form. Mechanical properties of metals constitute the bulk of the report; included are data on commercially pure Ti and 8 Ti alloys, several Al alloys in various cold worked and/or heat treated conditions, Type 301 stainless steel, 20 and 25% Ni steels, and Rene 41 Ni-base alloy. Cryogenic testing was emphasized in most of this work. Subsequent sections of the report contain single reports concerning tensile properties of structural plastics at low temperature, X-ray diffraction studies of martensite content in Type 301 stainless steel, and linear expansion determinations at low temperatures on Polycel 420 and Conolon 506. (Author)

AD-273 080 Div. 14, 8
(TISTM/EJH) OTS price $5.60

Motorola, Inc., Chicago, Ill.
CONFORMAL COATINGS FOR PRINTED CIRCUIT ASSEMBLIES.
Quarterly rept. no. 2, 1 Nov 61-30 Jan 62,
by Anthony J. Beccasio. 30 Jan 62, 60p. incl. illus. tables.
(Contract DA 36-039-sc-89136, Proj. 5999-004)
Unclassified report

DESCRIPTORS: (*Printed circuits, *Coatings, *Plastic coatings, Epoxy resins, Silicone resins, Polymers, Urethanes, Resins on Laminates, Glass, Paper, Copper.) (*Electric insulation, Thermal insulation, Materials, Electrical properties, Dielectric properties, Adhesion, Corrosion, Moistureproofing.) Military requirements.

Contents:
Epoxy resin coating systems
Physical and electrical properties: Dielectric constant, dissipation factor and Q factor of the disc specimens; Q factor and dissipation factor of the coated test panels; Thermal cycling; Dielectric withstanding voltage; Insulation resistance under moisture conditions
Polyurethane resin coating systems
Physical and electrical properties: Dielectric constant, dissipation factor and Q factor of the disc specimens; Q factor and dissipation factor of the coated test panels; Thermal cycling; Dielectric withstanding voltage; Insulation resistance under moisture conditions
Silicone-based polymer coatings
Characteristics of coating systems
Test panels used
Precoating preparation of surface
Physical and electrical properties

AD-273 081 Div. 14
(TISTM/LH) OTS price $9.10

Monsanto Research Corp., Everett, Mass.
LITERATURE SURVEY ON HIGH TEMPERATURE ADDITIVES FOR LUBRICANTS AND HYDRAULIC FLUIDS, SUPPLEMENT NO. 2,
by Glenn R. Wilson, John R. Stemniski and Emery N. Wescott. 30 Sep 61, 108p.
(Contract AF 33(616)7853; Continuation of Contracts AF 33(616)5550 and AF 33(616)7083)
Unclassified report

DESCRIPTORS: *Bibliography, *Hydraulic fluids, Lubricants, *Additives, High temperature research.

AD-273 135 Div. 14, 20
(TISTM/LH) OTS price $4.60

Lockheed Aircraft Corp., Sunnyvale, Calif.
RADIATION EFFECTS ON TEFLON: AN ANNOTATED BIBLIOGRAPHY,
comp. by William L. Hollister. Feb 62, 41p.
(Special bibliography no. SB-61-65; Rept. no. 3-88-61-2)
(Contract AF 04(647)840)
Unclassified report

DESCRIPTORS: (*Bibliography, Radiation effects.) *Radiation damage, Polymers, Fluorides, Ethylenes, Plastics, *Fluorocarbons.

AD-273 137 Div. 14, 17
(TISTM/EJH) OTS price $10.10

Aeroelastic and Structures Research Lab., Mass. Inst. of Tech., Cambridge.
A THEORETICAL ANALYSIS AND EXPERIMENTAL STUDY OF THE BEHAVIOR OF PANELS OF ISOTROPIC AND ORTHOTROPIC MATERIAL UNDER STATIC AND DYNAMIC LOADS,
by Hans A. Balmer, Emmett A. Witmer, and William A. Loden. Feb 62, 114p. incl. illus. tables, 6 refs. (Technical rept. 98-3; Lincoln Lab. rept. no. 71G-2)
(Subcontract to Lincoln Lab., Mass. Inst. of Tech., Contract AF 19(604)7400)
(AFESD TDR 62-59)
Unclassified report

DESCRIPTORS: (Sheets, Metal plates, *Glass textiles, Laminates, *Sandwich panels, *Aluminum alloys, Foils, *Stresses, Loading, *Failure (Mechanics), Theory, Mathematical analysis, Programming.) (Radomes, Structures.) (Test methods, High pressure research, Hydrostatic pressure, Shock waves, Test equipment, Shock tubes.)

A theoretical analysis of isotropic and orthotropic plates was applied to predict the stresses and deflections of triangular panels of small thickness. Static-load and step-function dynamic-load cases were analyzed and compared with the experimental data. (Author)

AD-273 163 Div. 14, 26
(TISTM/GEC) OTS price $2.60

Westinghouse Electric Corp., East Pittsburgh, Pa.
RESIN SHRINKAGE RELATED TO THE PERFORMANCE OF FILAMENT WOUND STRUCTURES.
Progress rept. for 15 Dec 61-15 Feb 62,
by R. N. Sampson. 15 Feb 62, 19p. incl. illus. tables (Technical memo. no. 181)
(Contract Nonr-353700)
Unclassified report

DESCRIPTORS: (*Filament wound construction, *Epoxy resins, Polymerization (Shrinkage), *Reinforcing materials, *Glass, Processing.) (Tests, Hydrostatic pressure, Tensile properties, Elasticity, Stresses, Physical properties.)

The polymerization shrinkage of candidate filament winding resins was determined. The stresses generated by cast samples of these resins is presented. Internal friction and physical strengths of filament wound resin-glass composites are presented. (Author)

AD-273 215 Div. 14, 25
(TISTP/TL) OTS price $7.60

California U., Berkeley.
TRANSIENT TEMPERATURE DISTRIBUTIONS IN A THERMALLY ORTHOTROPIC PLATE WITH NON-UNIFORM SURFACE HEATING.
Master's thesis,
by David Ross Hornbaker. 5 June 61, 70p. incl. illus. 9 refs. (Rept. no. HE-150-189; Series 128, Issue no. 7)
Unclassified report

DESCRIPTORS: (*Plating, *Sheets, Surface temperatures, *Heat transfer.) (Materials, Heat shields or sink, Thermal conductivity.) (Graphite, Temperature, Measurement, Physical properties, High temperature research.)

A solution is obtained for the two-dimensional transient temperature variation in a thermally orthotropic plate subjected to an arbitrary heating rate distribution along one face with other surfaces insulated. Dimensionless temperature histories and distributions determined from this solution are presented for the special, but representative, case of a linearly varying heating rate distribution on plates with varying degrees of thermal orthotropy. These results establish quantitatively the value of a material with high planar and low normal thermal conductivities for applications where it is desired to maintain minimum temperatures on the rear or unheated surface of a heat shield when the heated surface is subjected to a very non-uniform heating rate distribution. The applicability of simplifying assumptions in analyzing such a system is discussed. Experimental temperature measurements in a pyrolytic graphite plate heated by an oxyacetylene flame were made to verify the analytical results. (Author)

AD-273 219 Div. 14
(TISTM/GEC) OTS price $7.60

General Dynamics/Astronautics, San Diego, Calif.
CRYOGENIC ADHESIVE EVALUATION STUDY,
by J. Hertz. 25 Jan 61, 74p. incl. illus. 8 refs. (Rept. no. ERR-AN-032)
(Contract AF 33(616)7984)
Unclassified report

DESCRIPTORS: (*Adhesives, *Resin adhesives, Epoxy resins, Nylon, Nitriles, Phenolic resins, Polymers, Amides, Urethanes.) (Bonding of Alloys, Stainless steel, Aluminum alloys, Titanium alloys, Laminates, Glass textiles, Phenolic resins, Polymers, Esters.) (Cryogenics, Adhesion, Mechanical properties, Shear stresses, Thickness, Elasticity, Tests.)

Five classes of adhesives were evaluated at cryogenic temperatures on the basis of reported high lap-shear strengths at -65 and 75 F. Lap-shear specimens were tested at -423, -320, -100, and 75 F utilizing epoxy-nylon adhesives (Metlbond 406, AF-40 and FM-1000), nitrile-phenolic adhesives (Metlbond 4041 and AF-32), epoxy-polyamide adhesives (Resiweld No. 4 and Narmco 3135), an epoxy-phenolic adhesive, (Metlbond 302-A), and a polyurethane adhesive (APCO 1219). The adherends utilized were: 0.020 in. EFH 301 CRES, 0.064 in. 2024-T3 bare Al, 0.020 in. A-110-AT Ti, 0.125 Conolon 506 (phenolic-fiberglass laminate) and 0.125 in. Conolon 527 (polyester-fiberglass laminate). Butt-tensile tests were conducted with 3/4 in. round stock 321 stainless steel and AF-40 epoxy-nylon adhesive. The epoxy-nylon adhesives had the highest lap-shear strengths with all adherends over the entire temperature range. The nitrile-phenolic adhesives gave excellent results from -320 to 78 F but dropped off sharply at -423 F. The epoxy-phenolic adhesives gave uniform but lower results over the complete temperature range. Room-temperature cured adhesives were generally inferior to those that were heat cured. (Author)

AD-273 222 Div. 14, 25
(TISTM/BRW) OTS price $3.60

General Dynamics/Astronautics, San Diego, Calif.
A STUDY OF DEFORMATIONAL MECHANISMS IN DUCTILE CERAMICS.
Progress rept. no. 1,
by J. A. Amy and J. F. Haskins. July 61, 26p. incl. illus. 7 refs. (Rept. no. ERR-AN-067)
(Contract AF 33 (616)7984)
Unclassified report

DESCRIPTORS: (*Ceramic materials, *Brittle materials, Solids, Single crystals, *Deformation, *Plasticity, Mechanical properties, Physical properties.) (Test methods, Test equipment.) (*Sodium compounds, Chlorides, *Magnesium compounds, Oxides, Data.) Solid state physics.

An investigation was begun of the effects of environment on the strength of ionic solids. A small 2-point loading bend-testing instrument was designed, built, and tested. An improved technique for cleaving ionic crystals is being developed. Both back reflection and transmission Laue photographs were obtained of strained and unstrained crystals. Preliminary electron microscopic studies were started. (Author)

AD-273 224 Div. 14
(TISTM/GEC) OTS price $.50

Georgia Inst. of Tech. Engineering Experiment Station, Atlanta.
DEVELOPMENT OF SHADE STANDARD AND TOLERANCES FOR CLOTH, COTTON, WIND-RESISTANT SATEEN, SHADE BLUE 1517.
Rept. for Feb-Sep 61 on Research on Textile Standard and Shade Tolerances,
by Arthur M. Herron. Dec 61, 14p. incl. tables, 7 refs.
(Contract AF 33(616)7907, Proj. 6314)
(ASD TR 61-518) Unclassified report

DESCRIPTORS: (Textiles, *Cotton textiles, Dyes, *Colors, Standards, Weatherproofing, Processing, Measurement, Light, Reflection.) Reflectometers.

Shade standards and tolerances were developed for combed cotton sateen, MIL-C-557D, in shade Blue 1517. Alternative dye formulations were developed by laboratory dyeings made to simulate commercial continuous dye practice. Visual and instrumental characterization of the standard and tolerances was accomplished. A multipurpose reflectometer was used for instrumental characterization of the dyed materials. The shade standard was produced in a commercial finishing plant using a continuous dyeing system with minor shade correction utilizing a batch method. The tolerance spacing was determined by visual means and the shade difference as detected by the instrument was then related to the selected shade standard. Although a measure of correlation was obtained, a number of eccentricities were encountered. The report discusses some reasons for these deviations. (Author)

AD-273 276 Div. 14, 17, 26
(TISTM/GEC) OTS price $3.60

Vitro Labs., West Orange, N. J.
SUBMICRON SIZED PARTICLES.
Interim technical engineering rept., 1 Oct-31 Dec 61,
by J. D. Holmgren, J. O. Gibson, and R. Weidman.
Feb 62, 28p. incl. illus. tables.
(Contract AF 33(600)42916, Proj. 7-884)
(ASD TR 7-884, vol. 3) Unclassified report

DESCRIPTORS: (*Refractory materials, *Ceramic materials, Particles, *Powder metals, Preparation, Vaporization, Chemical properties, Physical properties.) (Oxides of Aluminum compounds, Tungsten compounds, Molybdenum compounds, Iron compounds, Magnesium compounds, Zirconium compounds, Niobium compounds, Silicon compounds, Thorium compounds.) (Metals, Molybdenum, Tungsten, Aluminum.) (Carbides, Tantanlum compounds.)

Process development studies and production of various submicron refractory and non-refractory oxides, metals, and carbides were completed. The arc vaporization technique was utilized in each application. Extensive characterization and analysis of these materials were completed. All of the products had average particle sizes less than 1000 Angstroms (0.1 micron) and purities exceeding 99 wt-%. Studies were completed on a number of materials including SiO_2, Al_2O_3, ThO_2, MoO_3, WO_3, and TaC. Materials still in the development stage included MgO, Fe_2O_3, ZrO_2, and Mo, W, Nb, and Ti metals. (Author)

AD-273 290 Div. 14, 4
(TISTM/GEC) OTS price $2.60

Borden Co., Philadelphia, Pa.
STUDY LEADING TO THE DEVELOPMENT OF REINFORCED HIGH TEMPERATURE ELASTOMERS.
Quarterly progress rept. no. 2, 1 Oct-31 Dec 61,
by K. C. Tsou and B. D. Halpern. 31 Dec 61,
20p. incl. illus. tables.
(Contract DA 36-034-ORD-3523)
Unclassified report

DESCRIPTORS: (*Elastomers, Synthetic rubber, *Silicones, *Reinforcing materials, High temperature research.) (Silicones, Chemical reactions, Hydrolysis, Phenyl radicals, Chlorides, Silanes or Cyanates or Titanium compounds.) (Mechanical properties, Tensile properties, Elasticity, Viscosity, Hardness, Temperature, Stability.)

Experiments were carried out in the modification of silica filler by the reaction of phenyl trichlorosilane, diphenyl dichlorosilane, the triphenyl chlorosilane. The order of reactivity of the reaction medium for silane treatment was nitrobenzene greater than tetrahydrofuran greater than acetone greater than methylene chloride greater than benzene. The filler-silicon rubber interaction was studied by weight loss and swelling measurement during heat-aging. The possible significance of cross-linking and oxidative degradation were discussed. Evaluation of the modified filler was done with a methyl phenyl vinyl silicone, Silastic 440. The diphenyl chlorosilane treated sample showed fair elongation at 500 F. but relatively low tensile strength when measured at that temperature. (Author)

AD-273 400 Div. 14, 26
(TISTM/BRW) OTS price $2.75

Plastics Technical Evaluation Center, Picatinny Arsenal, Dover, N. J.
DESIGN CRITERIA FOR PLASTIC PACKAGE-CUSHIONING MATERIALS,
by Mario E. Gigliotti. Dec 61, 122p. incl. illus. tables, refs. (Plastic rept. 4)
Unclassified report

DESCRIPTORS: (*Plastics, Materials, *Packaging, Containers, Shock resistance, Design, Theory.) (Expanded plastics, Stresses, Mechanical properties, Physical properties.) (Polymers, Urethanes, Styrenes, Ethylenes.)

Packages capable of protecting fragile items from shock must be purposefully designed to be practical, efficient, and economical. The general design theory of package cushioning is given, and testing under static loading and dynamic loading are discussed. Design concepts are evaluated, with advantages indicated for the use of acceleration vs static stress data. Design equations and sample problems are included. As support information, the stress properties of the principal plastic package-cushioning materials are given, as well as data on the effect of temperature and humidity. Specific uses of rigid and semirigid plastic foams in cushioning applications are indicated. The report contains a summarization of package-cushioning test programs at 6 laboratories, an extensive reference list, and a bibliography. (Author)

AD-273 425 Div. 14, 25
(TISTM/GEC) OTS price $6.60

Materials Research Lab., U. of Calif., Berkeley.
THE EFFECT OF GRAIN BOUNDARIES ON THE MECHANICAL PROPERTIES OF IONIC CRYSTALS.
Rept. on Ductile Ceramics Research,
by S. Feuerstein and E. R. Parker. Jan 62, 32p. illus. 65 refs. (Technical rept. no. 5; Series no. 150, Issue no. 5)
(Contract AF 49(638)601)
(AFOSR-2169) Unclassified report

DESCRIPTORS: (*Lithium compounds, *Fluorides, Ions, *Crystals, *Single crystals, Crystal structure, Lattices.) (Tests, Mechanical properties, Deformation, Plasticity, Fracture (Mechanics), Rupture, Failure (Mechanics), Tensile properties, Brittle materials.) Growth.

Room temperature tensile tests were conducted on single crystal, bicrystal, and polycrystalline LiF. Their mechanical behaviors were compared and the effects resulting from the presence of grain boundaries evaluated. The fracture processes of single crystal and bicrystal specimens were also investigated. Favorably oriented, chemically-milled single crystals attained tensile strains as high as 27% before failing. Ductile fractures resulted from internal sources, but fractures from low strains were due to surface sources. Stress-strain curves of bicrystals indicated that grain boundaries in ionic crystals were not inherently weak. Plastic deformation in at least one grain always preceded fracture. The presence of a grain boundary afforded a strong barrier to dislocation motion, becoming more effective the greater the degree of bicrystal misorientation. Evidence of slip lines on only one side of matching intergranular surfaces revealed that transmission of slip across a grain boundary was difficult. Failures took place in a brittle fashion predominantly along an inter- and transgranular path. Strains at fracture seldom exceeded 2-1/2%. (Author)

15. MATHEMATICS

AD-273 083 Div. 15
(TISTP/TL) OTS price $13.00

Institute of Mathematical Sciences, New York U., N. Y.
PROPERTIES OF SOLUTIONS OF ORDINARY DIFFERENTIAL EQUATIONS IN BANACH SPACE,
by S. Agmon and L. Nirenberg. Dec 61, 188p. incl. illus. refs. (Rept. no. IMM-NYU 287)
(Contract DA 30-069-ORD-2153)
(AROD rept. no. 247:52)
Unclassified report

DESCRIPTORS: (*Differential equations, Topology, *Functional analysis, Cylindrical bodies.) (Partial differential equations, Inequalities, Integral transforms, Operators (Mathematics), Polynomials.) Real numbers.

This analysis concerns the study of equations of the form $Lu = \frac{1}{i}\frac{du}{dt} - Au = 0$ for functions u(t) with values in some Banach space, as well as inhomogeneous equations Lu = f and slightly perturbed equations, with the main emphasis on the behavior of solutions as $t \to +\infty$. Treated are equations for which the initial value problem (prescribing u at some value of t) is not necessarily well posed. Particularly considered are equations arising from partial differential equations in a cylinder (with t axis along the generator) which may be elliptic, and for which, therefore, the initial value problem is indeed not well posed. The operator A then represents a partial differential operator in the variables in the base of the cylinder. (Author)

AD-273 207 Div. 15
(TISTP/MFA) OTS price $1.60

Boeing Scientific Research Labs., Seattle, Washington.
UNIFORM DISTRIBUTIONS OVER A SIMPLEX,
by G. Marsaglia. Dec 61, 9p. (Mathematical note no. 250; Document no. D1-82-0152)
Unclassified report

Also available from the author.

DESCRIPTORS: (Statistical distributions, *Scheduling, Probability, *Numerical methods and procedures, Transformations (Mathematics).)

The principal purpose of this simplex is to provide a method for generating exponential (and hence normal, using polar coordinates) random variables in a computer -- the random vector, pi, is chosen from S(n+1), then a random variable z is chosen so that zp1, zp2,...,zp(n+1) are independent and exponentially distributed. Vector pi may be used to produce points uniformly over the simplex supported by an arbitrary set of n + 1 linearly independent points in space. Thus the main purpose of the development is to provide some theory on which certain Monte Carlo techniques may be based, but the development will also provide an approach to problems involving uniform order statistics which is different from that usually taken. (Author)

AD-273 288 Div. 15
(TISTP/TL) OTS price $9.60

Air Force Cambridge Research Labs., Bedford, Mass.
A NEW METHOD OF FINDING ROOTS OF A FOURTH ORDER POLYNOMIAL WITH REAL COEFFICIENTS,
by Kurt H. Haase. Jan 62, 107p. incl. illus. tables, 12 refs. (Rept. no. AFCRL 62-44)
(Proj. 5632)
Unclassified report

DESCRIPTORS: (Roots of a 4th order, *Polynomials, Equations, Numerical analysis, Matrix algebra.)

A fourth order equation with real coefficients has four roots. These roots may comprise (1) two conjugate complex pairs, (2) one conjugate complex pair and one real pair, or (3) four real roots of which any two may be considered as a pair. Therefore the polynomial in equation f(z) = 0 can be written as f(z) = (z2 + y1z + x1) (z2 + y2z + x2). When the components y1, y2, and x1, x2 are known, the roots of the equation are known. A polynomial, V(y), of the sixth order and a polynomial, $\phi(Y)$, of the third order have been derived from f(z). Theorem 1 states that y1 and y2 are real roots of V(y), and Theorem 2 states that Y = y1y2 is a real root of $\phi(Y)$. Thus, no matter whether the roots of f(z) are real or complex, components y1 and y2 can be found as the real roots of the one or the other derived polynomial. The other components are found by a substitution of y1 and y2 in an explicit formula. This is the result contained in Part I. Part II contains appropriate method of numerical analysis to find the real roots of a polynomial (Horner and Collatz methods) schematized in forms that permit the numerical procedure to be performed as routine work. Detailed instructions and ten examples are provided. (Author)

16. MEDICAL SCIENCES

AD-273 095 Div. 16
(TISTB/LH) OTS price $.50

Aerospace Medical Lab., Aeronautical Systems Div., Wright-Patterson Air Force Base, Ohio.
SKIN TEMPERATURE RESPONSES TO SIMULATED THERMO-

NUCLEAR FLASH.
Rept. on Biophysics of Flight,
by William C. Kaufman, A. G. Swan, and H. T. Davis. Sep 61, 5p. incl. illus. table, 13 refs.
(Proj. 7222)
(ASD TR 61-510) Unclassified report

DESCRIPTORS: (*Skin, Body temperature, Measurement, Nuclear explosions, Simulation.) (*Heat tolerance, Man.)

Skin temperatures and radiant energy were measured on a subject wearing flight clothing, sitting in a tactical aircraft exposed to thermal energy characteristic of thermonuclear weapons. Radiant energy source was 960 lamps at power levels up to 4000 kilowatts. After exposures of increasing severity, subject tolerance was attained in a 3 cal/sq cm pulse of 3.7 seconds duration. This pulse charred paint on the fuselage and headrest and seared the subject's glove. Bare forehead skin temperature reached 126 F resulting in distinct pain. The data provide a basis for calculating the nearest safe distance of aircrew members to a nuclear explosion. (Author)

AD-273 098 Div. 16
(TISTB/CCH) OTS price $2.50

Aerospace Medical Lab., Aeronautical Systems Div., Wright-Patterson Air Force Base, Ohio.
AERONAUTICAL SYSTEMS DIVISION STUDIES IN WEIGHTLESSNESS: 1959-1960.
Rept. on Human Performance in Advanced Systems, comp. by Lois R. Hammer. Dec 61, 93p. incl. illus. tables, refs.
(Proj. 7184)
(WADD TR 60-715)
Unclassified report

DESCRIPTORS: (*Weightlessness, *Space medicine, Man.) (Test methods, Airborne, Flight testing, Water, Simulation, Rotation.) (Behavior, Stress (Psychology), Sensory perception, Reaction (Psychology).) (Stress (Physiology), Heart, Ear, Motion sickness, Motor reactions.)

Facilities and techniques used at Aeronautical Systems Division to study the effects of weightlessness are described; completed experiments and those started before January 1961 are discussed. Topics are grouped under two main headings: aerospace medical studies and aeromechanics studies. Specific problem areas and methods of experimentation are emphasized. Findings are briefly stated. (Author)

AD-273 230 Div. 16
(TISTB/CCH) OTS price $1.00

Indiana U., Bloomington,
A STUDY OF VISUAL PERFORMANCE USING OPHTHALMIC FILTERS.
Rept. for 1 June 60-1 June 61 on Space Biology Research,
by Merrill J. Allen. Oct 61, 29p. incl. illus. tables.
(Contract AF 33(616)7216, Proj. 7164)
(ASD TR 61-576) Unclassified report

DESCRIPTORS: (*Vision, *Optical filters, *Goggles, Effectiveness.) (Ophthalmology, Visual thresholds, Target recognition.)

A study of the visual performance through five regularly available ophthalmic filter glasses, five identical filter glasses uniformly coated to 10 percent transmission, and five other identical filter glasses with a gradient density coating transmitting 10 percent in the center of the lens and about 0.1 percent at the top of the lens was made using a 7- by 8- by 24-foot atmosphere chamber to simulate flight under adverse glare conditions. Controlled atmospheric conditions and chamber wall luminances of 7000 foot-lamberts and 400 foot-lamberts were provided. The far point test target was a threshold 1/2 degree white spot variable in brightness relative to the surround. The average time required to identify a target on the instrument panel without sunglasses was 0.5994 sec.; with ordinary sunglasses, 0.6093 sec.; with uniform coating, 0.7603 sec.; and with gradient coating, 0.5057 sec. These include over 300 findings for the no sunglasses to 1800 findings for the gradient coating. Differences in performance could be accounted for on the bases of over-all transmission effects without regard to filter color. Vision tended to be as good or better unaided than with most filters for a distant threshold target at about 490 foot-lamberts. However, at about 7000 foot-lamberts, the gradient density filter was again superior. (Author)

17. METALLURGY

AD-273 004 Div. 17
(TISTM/BRW) OTS price $2.60

Manufacturing Labs., Inc., Cambridge, Mass.
EFFECT OF MECHANICAL AND THERMAL PROCESSING ON HIGH-STRENGTH STEELS,
by P. J. Fopiano. Jan 62, 22p. incl. illus. tables.
(Contract DA 19-020-ORD-5253, Proj. 532-32-008)
(WAL TR 320.4/4-1) Unclassified report

DESCRIPTORS: (*Processing, Heat treatment and Deformation, Hardening, Aging on *Steel (H11), Mechanical properties, Tensile properties.) (Austenite, Determination by X-ray diffraction analysis.) (Microstructure by Electron microscopy.) (Fracture (Mechanics), Impact shock, Test methods.)

The effect of prestraining and aging on the mechanical properties of H11 was investigated for 2 other conditions of temper (600 and 1050 F). These tempering temperatures produce higher toughness levels than was obtained for specimens tempered at 975 F. The effect of the strain aging treatments of specimens tempered at 600 F showed much the same trend as for specimens tempered at 975 F. However, the magnitudes of the changes were much greater. Similar results were obtained for specimens tempered at 1050 F except that the magnitudes of the changes were considerably less than that obtained on specimens tempered at 600 F. Significant increases in yield strength were obtained at higher than expected toughness levels. Determinations of retained austenite and some observations of microstructures for the various tempered conditions are presented. (Author)

AD-273 017 Div. 17, 25
(TISTM/EJH) OTS price $6.60

Case Inst. of Tech., Cleveland, Ohio.
THE LOW FIELD DE HAAS - VAN ALPHEN EFFECT IN ZINC.
Technical rept. no. 3 on Solid State Physics Program,
by Alfred S. Joseph. Nov 61, 34p. illus. 25 refs.
(Contract AF 49(638)621)
(AFOSR-1757) Unclassified report

DESCRIPTORS: (Metals, *Zinc, Crystals, Single crystals, Brillouin zones, *Magnetic susceptibility, Magnetic fields, Quantum mechanics, Atomic energy levels, Theory.) Solid state physics.

A study of the low field de Haas-van Alphen effect in Zn employing automatic recording of the variation of the torque as a function of the reciprocal of the applied magnetic field revealed 6 sets of periods. These periods are assigned in a consistent manner to portions of the free-electron model of the Fermi surface (single OPW). Cyclotron masses associated with the 3 larger sets of the observed periods agreed well with the theoretical estimates. Evidence is obtained for the presence of a spin-orbit energy gap across the hexagonal face of the first Brillouin zone near the corners. Thus, the validity of the single Brillouin zone construction is demonstrated for Zn. (Author)

AD-273 018 Div. 17, 25
(TISTM/BRW) OTS price $4.60

Case Inst. of Tech., Cleveland, Ohio.
LOW TEMPERATURE STUDY OF THE ELECTRONIC BAND STRUCTURE OF METALS AND THEIR DILUTE ALLOYS.
Final rept. on Solid State Physics Program,
by William L. Gordon and Thomas G. Eck. Jan 62, 40p. incl. illus. 19 refs.
(Contract AF 49(638)621)
(AFOSR-2041) Unclassified report

DESCRIPTORS: (Metallic crystals, *Metals, Magnesium, Cadmium, Zinc.) (Single crystals, *Alloys, Tin alloys, Silver alloys, Magnesium alloys.) (Magnetic susceptibility, Hall effect, Electromagnetic properties, Resistance.) Low temperature research, Crystal structure, Lattices, Surfaces, Magnetic fields, Electric currents, Cyclotrons, Solid state physics.

Efforts were made to investigate the band structure of several pure metals through the combined techniques of de Haas-van Alphen (DHVA) effect (Progress in Low Temperature Physics, by D. Shoenberg, Vol. II, Ch. VIII, 1957) and cyclotron resonance of the type suggested by Azbel and Kaner (M.Ya. Azbel and E. A. Kaner, Soviet Physics JEPT 3:772, 1956). With this information available, it was hoped that DHVA studies in sufficiently dilute alloys of these metals would permit a study of the changes in band structure with alloying. A combination of interesting and useful results in pure metals together with difficulty in preparation of metallurgically trustworthy alloy single crystals led to a shift of emphasis to pure metals. At the same time, another tool for studying band structure was employed: galvanomagnetic effects, particularly the variation with magnetic field strength of the components of electric field parallel and transverse to the electric current in the limit of high magnetic field. (Author)

AD-273 020 Div. 17, 26
(TISTM/BRW) OTS price $2.60

Fansteel Metallurgical Corp., North Chicago, Ill.
TUNGSTEN SHEET ROLLING PROGRAM.
Interim rept. no. 8, 1 Nov 61-31 Jan 62,
by Verne Pulsifer. 14 Feb 62, 12p. illus. tables.
(Contract NOw 60-0621-c)
Unclassified report

DESCRIPTORS: (Production and Processing of *Tungsten, *Sheets.) (*Manufacturing methods, Preparation of Powder metals by Hydrogen, Reduction of Ammonium radicals, Tungstates by Powder metallurgy, Sintering and *Rolling mills.) (Transition temperature, Heat treatment, Deformation, Mechanical properties, Tensile properties.)

Ten full sized sheets (Pilot Lot Production) were finished by rolling. The average dimensions were 0.060 x 18.5 x 53 in. Testing is underway to determine the variation in properties. These sheets were processed by the best schedule determined in the experimental program. Preliminary notch tests were run at 1000 F to confirm that W is not notch sensitive above its transition temperature. (Author)

AD-273 038 Div. 17
(TISTM/AW) OTS price $1.60

Armour Research Foundation, Chicago, Ill.
INVESTIGATION OF HEAT TREATMENT AND WELDING CHARACTERISTICS OF B120 VCA TITANIUM ALLOY SHEET. PART II.
Quarterly rept. no. 4, 15 Sep-15 Dec 61, by John F. Rudy. 6 Feb 62, 5p. illus. (Rept. no. ARF-2211-4)
(Contract NOw 61-0351-c)
Unclassified report

DESCRIPTORS: (*Titanium alloys, *Sheets, *Welding, Heat treatment, Electromagnetic effects, Vibration, Aging.) (Arc welding, Oxygen.)

The special welding techniques of electromagnetic stirring and mechanical vibration of the freezing weld metal were studied to the extent that promising parameters were chosen and a sufficient number of welds have been made to supply an extensive study of heat treatment response. These welds are being subjected to a series of 800 F aging and 800 - 1000 F duplex aging treatments. Tensile data are presented for conventional welds after similar 800 F isothermal and duplex aging treatments. These data are better than comparable previous longitudinal tensile data which involved 900 F aging treatments. Tensile data are also presented for the aging of welds which were rolled prior to isothermal (800 F) and duplex aging treatments. (Author)

AD-273 040 Div. 17, 26
(TISTM/BRW) OTS price $2.25

Universal-Cyclops Steel Corp., Bridgeville, Pa.
MOLYBDENUM SHEET ROLLING PROGRAM.
Interim rept. no. 15, 26 Oct 61-25 Jan 62. by W. A. McNeish. 25 Jan 62, 73p. incl. illus. tables.
(Contract NOa(s) 59-6142-c)
Unclassified report

DESCRIPTORS: (Processing, *Sheets, *Molybdenum alloys, Titanium alloys and Zirconium alloys (TZM), Melting, Casting, Forging, Extrusion, Rolling mills, Heat treatment.) (Microstructure, Grains (Metallurgy), Carbides, Transition temperature, Tensile properties, Deformation, Tests.)

Mo+0.5%Ti alloy sheet was produced from hot forged sheet bar by a total of 81 practice variations. These practices ranged from 25 to 96% cold work with rolling temperatures from 1000 to 3000 F. Each practice was evaluated, resulting in a recommended practice for the production of sheet with improved properties. All sheet rolling in the Phase I development of consolidation and primary fabrication practices for TZM alloy was completed. About 9000 lb of Mo+0.5%Ti alloy for sheet production was melted and extruded. Hot forging to sheet bar is in progress. (Author)

AD-273 082 Div. 17, 26, 27
(TISTM/BRW) OTS price $1.60

National Research Corp., Cambridge, Mass.
DEVELOPMENT OF TANTALUM-TUNGSTEN ALLOYS FOR HIGH PERFORMANCE PROPULSION SYSTEM COMPONENTS.
Quarterly progress rept. no. 9, 21 Sep-20 Dec 61, by R. W. Douglass. 20 Dec 61, 16p. incl. illus. tables.
(Contract NOrd-18787)
Unclassified report

DESCRIPTORS: (*Tantalum alloys, *Tungsten alloys, *Rocket motor nozzles, Alloys, Carbonization, Tantalum compounds, Tungsten compounds, Carbides, Processing.) (Mechanical properties, Physical properties, Tensile properties, Transition temperature, Melting, Temperature, Thermal conductivity, Thermal expansion, Microstructure.) (Exhaust nozzles, Control surfaces, Erosion by Exhaust gases, Tests.) Heat resistant alloys.

Two Ta-20W and a Ta-30W alloy MERM nozzles were carburized to a depth of approximately 0.060 in. MERM and ARC nozzles are being prepared from Ta-10, 15, 20, and 30W alloys. A series of Ta, Ta-W alloys, and a Ta-10Hf alloy were carburized at 2300 and 2500 C. W additions to Ta increase the rate of carburization, and the dimensional changes occurring during carburization at both 2300 and 2500 C. W additions also appear to change the carbide morphology and phase relations in the Ta-C system. Ta-15 and 30W ingots were prepared for fabrication studies and subsequent fabrication to rod and sheet. These ingots and a Ta-20W ingot will supply the stock for evaluation of the mechanical and physical properties of the alloys and the alloy carbides. (Author)

AD-273 090 Div. 17, 4, 14, 22
(TISTM/BRW) OTS price $1.50

National Aeronautics and Space Administration, Washington, D. C.
THE PRODUCTION OF SUBMICRON METAL POWDERS BY BALL MILLING WITH GRINDING AIDS,
by Max Quatinetz, Robert J. Schafer and Charles R. Smeal. Mar 62, 51p. illus. tables, 22 refs. (Technical note D-879)
Unclassified report

Also available from NASA, Wash. 25, D. C., as NASA Technical note D-879.

DESCRIPTORS: (Production, *Powder metals, Abrasives, Liquids, *Ball mills.) (Copper, Iron, Chromium, Nickel, Silver.) (Water, Cyclohexanes, Heptanes, Chlorides, Methanes, Ethanols.) Inorganic substances, Salts, Reagents, Pigments, Coatings, Soldering alloys, Propellants, Powder metallurgy, Dispersion hardening, Metals.

Normally, ductile metal powders cannot readily be ground to submicron particle sizes because of agglomeration or welding phenomena which occur in the grinding mill. The paper describes how Ni and several other metal powders were ground by ball milling to sizes as fine as 0.1 micron. Various grinding aids (metal salts with different ion size, valence, and polarizability) plus conventional surfactants were employed. Ethyl alcohol, water, cyclohexane, n-heptane, and methylene chloride were used as grinding fluids. Milling was conducted with Cr, Fe, Cu, Ag, and Ni powders of different particle sizes. Generally salts proved more effective than surfactants. The effectiveness of a salt as a grinding aid was related to the valence characteristics and complexity of its ions. All the metal powders were successfully ground to sizes less than 1 micron. The grinding fluid employed significantly affected the grindability of the metal powders. The time required to obtain submicron metal powders can be decreased by using the grinding aids in an attritor. The method is economical and can be applied to alloy powders and refractory compounds. (Author)

AD-273 091 Div. 17, 26, 25
(TISTM/BRW) OTS price $6.60

Technical U. of Norway, Trondheim.
MEASUREMENTS OF TEMPERATURES OUTSIDE AND IN THE WELD POOL IN SUBMERGED ARC WELDING.
Final technical rept., 1 Aug 60-1 Jan 62,
by N. Christensen and K. Gjermundsen. 1 Jan 62, 26p. illus. tables, 16 refs.
(Contract DA 91-591-EUC-1530)
Unclassified report

DESCRIPTORS: (Metals, *Arc welding, Welding fluxes, Slags, Shielding, Electric arcs.) (Arc welds, *Welded joints, *Temperature, Measurement.) (Heat transfer, Electric arcs, Theory, Analysis, Calorimeters, Electric currents, Electric potential.) Thermoelectricity, Metallurgical analysis, Crystal structure, Microstructure.

Calorimetric measurements of the net heat transferred to the weldment indicate a thermal efficiency of about 90%. Measurements of fused-metal and recrystallized-metal cross-sections are shown to agree fairly well with values predicted from the point-source theory of heat conduction. Larger deviations are encountered in the measurement of depth and width of the fused and recrystallized metal zones. The length of the pool is found of the order of 50% in excess of the theoretical value. Qualitative agreement has been obtained between measured weld pool temperatures and an average bath temperature derived from the temperature distribution outside the pool. The experimental data are not sufficiently precise for a quantitative comparison. (Author)

AD-273 119 Div. 17, 14
(TISTM/GEC) OTS price $1.60

Armour Research Foundation, Chicago, Ill.
HIGH-TEMPERATURE OXIDATION PROTECTIVE COATINGS FOR VANADIUM-BASE ALLOYS.
Bimonthly progress rept. no. 4, 12 Dec 61-11 Feb 62,
by F. C. Holtz. 7 Mar 62, 14p. incl. illus. table, 1 ref. (Rept. no. ARF 2227-4)
(Contract NOw 61-0806-c)
Unclassified report

DESCRIPTORS: (Alloys, Heat resistant alloys, High temperature research, *Vanadium alloys, Titanium alloys, Niobium alloys, Coatings, *Antioxidants, Oxidation inhibitors, *Metal coatings, Nickel plating, *Ceramic coatings, Silicon coatings.) (Flame spraying, Electrodeposition, Intermetallic compounds, Nickel compounds, Yttrium compounds, Oxides, Boron compounds, Silicides.) (Tests, Mechanical properties, Deformation, Tensile properties.)

Coatings for the protection of V alloys in air at 2000 F and up were investigated. Ni, flame-sprayed on V-Nb alloys, formed an intermetallic compound and an outer glassy phase upon exposure to elevated-temperature air. Protection of V-1 wt-% Ti-60 wt-% Nb was afforded for 45 hr at 2200 and more than 150 hr in air at 2000 F. After intentional deflecting, failures were extremely slow compared to the unprotected alloy base. Siliconized V-1 wt-% Ti-60 wt-% Nb, produced in a static Ar pack cementation process, was oxidation resistant for at least 800, 290, and 50 hr in static air at 2000, 2200, and 2500 F, respectively. Samples of V-5 wt-% Ti-20 wt-% Nb, coated similarly, were oxidation resistant for 456, 280, and 259 hr at 1500, 2000, and 2200 F, respectively. Coatings on the higher-Nb alloy show a capability for tolerating defects which had not been noted in the low-Nb alloys. Siliconized samples of V-1 wt-% Ti-60 wt-% Nb, deformed by bending at room temperature to a stress near the yield point, appeared to be oxidation resistant when subsequently exposed to 2000 F air. (Author)

AD-273 142 Div. 17, 26
(TISTM/BRW) OTS price $3.60

New England Materials Lab., Inc., Medford, Mass.
HARD PARTICLE STRENGTHENING OF REFRACTORY METALS FOR HIGH TEMPERATURE USE THROUGH INTERNAL OXIDATION.
Final rept., 1 Jan-31 Dec 61,
by A. S. Bufferd, K. M. Zwilsky and N. J. Grant. 31 Dec 61, 33p. incl. illus. tables, 18 refs.
(Contract NOw 61-0316-c)
Unclassified report

DESCRIPTORS: (Heat resistant alloys, *Refractory materials, *Dispersion hardening, Oxidation, Powder alloys, Powder metals, *Molybdenum alloys, Titanium alloys.) (Molybdenum compounds, Titanium compounds, Dioxides, Oxides, Sintering, Diffusion.) Alloys, Metals.

Mo-1.5% Ti powder in the 2 to 50 micron size range was internally oxidized by the formation of a MoO2 film on the powder particles and TiO2 formation during a diffusion-sintering treatment. Diffusion-sintering was carried out in an Ar or H atmosphere to investigate the effects of this atmosphere on the resultant structure. Fabrication of Mo base powder compacts was improved by prior hot upsetting and vacuum canning before extrusion of alloy billets. The most successfully extruded alloys had a recrystallization temperature in excess of 2800 F and a yield strength greater than the tensile strength of arc cast Mo-1.5% Ti at 2200 F. (Author)

AD-273 165 Div. 17, 26
(TISTM/BRW) OTS price $1.75

Reactive Metals, Inc., Niles, Ohio.
MANUFACTURE OF Ti-7Al-12Zr SHEET.
Final rept., 1 June 59-31 Jan 62,
by J. K. Dietzel. Jan 62, 58p. incl. illus. tables.
(Contract NOa(s) 59-6229-c)
Unclassified report

DESCRIPTORS: (Manufacturing methods, Production, Processing, Metal plates, *Sheets, *Titanium alloys (Ti-7Al-12Zr), Aluminum alloys, Zirconium alloys.) (Tensile properties, Creep, Microstructure, Surface properties, Contamination.) (Melting, Electric arcs, Vacuum furnaces, Forge presses, Rolling mills, Heat treatment, Cleaning.)

The properties of Ti-7Al-12Zr sheet were found to be very sensitive to an O rich layer at the sheet surface. However, by proper cleaning procedures, the O rich layer was eliminated, and satisfactory properties were obtained. The alloy was also relatively sensitive to annealing temperature. Sheet annealed at temperatures between 1550 and 1600 F exhibited the best combination of mechanical properties. Using the process developed during the investigation, eleven 0.040-, twenty-four 0.063-, and eleven 0.125-in. prime sheets were made. Difficulties were encountered in producing 0.020-in. gage sheet. However, a final grinding process was developed which resulted in sheet with satisfactory properties. (Author)

AD-273 177 Div. 17, 26
(TISTM/BRW) OTS price $4.60

Battelle Memorial Inst., Columbus, Ohio.
DEVELOPMENT OF A DUCTILE TUNGSTEN SHEET ALLOY.
Quarterly progress rept. no. 3, 26 Oct 61-26 Jan 62,
by J. L. Ratliff, D. J. Maykuth and others.
26 Feb 62, 46p. incl. illus. tables.
(Contract NOw 61-0677-c)
Unclassified report

DESCRIPTORS: (Preparation, Sheets, *Tungsten, *Tungsten alloys, Thorium compounds, Zirconium compounds, Oxides, Rhenium alloys, Ruthenium, Osmium, Iridium alloys, Platinum alloys.) Heat resistant alloys, Refractory materials, Production, Powder alloys, Powder metallurgy, Sintering, Sintered alloys, Rolling mills, Alloys, Metals, Dispersion hardening, Solids, Solutions, Solid state physics, Deformation, Hardness, Microstructure, Mechanical properties, Grains (Metallurgy), Transition temperature, Phase transitions.

AD-273 184 Div. 17, 32
(TISTM/CCH) OTS price $4.60

Defense Metals Information Center, Columbus, Ohio.
DEFENSE METALS INFORMATION CENTER SELECTED ACCESSIONS,
comp. by Virginia L. Frazier. Feb 62, 37p.
(Contract AF 33(616)7747, Proj. 2(8-8975))
Unclassified report

DESCRIPTORS: (*Bibliography, *Heat resistant alloys, *Metals, *Ceramic materials, *Refractory materials, Alloys.) (Stainless steel, Steel, Iron alloys, Nickel alloys, Beryllium, Titanium, Magnesium, Niobium, Chromium, Molybdenum, Tantalum, Vanadium, Tungsten.) Coatings.

AD-273 213 Div. 17, 4
(TISTM/BRW) OTS price $2.60

Central Inst. for Industrial Research (Norway).
METALLIC OXIDE PHASES OF NIOBIUM AND TANTALUM. I. X-RAY INVESTIGATIONS,
by N. Norman. Oct 61, 19p. incl. illus. tables, 19 refs. (Technical note no. 1; SI Pub. no. 336)
(Grant AF-EOAR-61-42)
(ARL-239) Unclassified report

DESCRIPTORS: (Phase studies, Metallic compounds, Oxides, *Niobium, *Tantalum, Niobium compounds, Tantalum compounds, Oxygen, *Oxidation, X-ray diffraction analysis.) (Metals, Crystal structure, Lattices, Phase transitions.)

Oxidation studies on Nb confirmed the existence of the tetragonal suboxide NbOx with a suggested x-value of 1/2. At temperature between 400 and 500 C in O of reduced pressure, a new tetragonal metallic oxide, NbOz, was found with a unit cell approximately 6 times that of the metal. The length of the axes are a equals 6.64 sub 5 angstrom, c equals 4.80 sub 5 angstrom. Ta also forms 2 metallic oxide phases. The orthorhombic phase TaOy with an estimated y-value of 1/4 has been known previously. By prolonged oxidation TaOy transforms into a second suboxide, TaOz, which is isomorphous with NbOz. Its cell dimensions are a equals 6.68 sub zero angstrom, c equals 4.75 sub 8 angstrom. No indication was found for a Ta suboxide isomorphous with NbOx. All the oxides have a metallic appearance and show an expected epitaxial growth. The composition, structure, and stability of the phases are not fully known. (Author)

AD-273 214 Div. 17, 4
(TISTM/BRW) OTS price $6.60

Central Inst. for Industrial Research (Norway).
OXIDATION OF TANTALUM AT 300-550 C,
by Per Kofstad. Nov 61, 62p. incl. illus. tables, 43 refs. (Technical note no. 3; SI Pub. no. 338)
(Grant AF-EOAR-61-42)
(ARL-240) Unclassified report

DESCRIPTORS: (Phase studies, *Tantalum, Oxygen, *Oxidation, Reaction kinetics, Solubility.) (X-ray diffraction analysis, Lattices, Microstructure, Tantalum compounds, Oxides.) (Electron diffraction analysis, Electron microscopy, Metallurgical analysis, Hardness.)

The work comprises gravimetric oxidation rate measurements and X-ray diffraction, electron diffraction, electron microscopy, metallographic and microindentation hardness studies of oxidized specimens. Direct X-ray diffraction and metallographic observations were made on specimens during oxidation. The oxidation constitutes O dissolution in the metal, formation of the metallic oxide phases TaOy and TaOz, and formation of Ta2O5. The relative importance of the various part-processes involved in the oxidation is a function of temperature, O pressure, and time of oxidation. Initial oxidation below 450 C conforms with a logarithmic oxidation. This is interpreted in terms of a rate-determining nucleation and formation of the metallic oxide phases. Over longer periods and during initial oxidation at higher temperatures the oxidation is approximated by a parabolic oxidation behaviour which mainly constitutes a rate-determining O dissolution in the metal and associated metallic oxide formation. Above 450 C, the initial approximate parabolic oxidation is followed by a breakaway oxidation which is associated with Ta2O5-formation. The breakaway oxidation is interpreted in terms of an O chemisorption equilibrium followed by a rate-determining reaction governed by nucleation and growth of Ta2O5-nuclei. (Author)

AD-273 216 Div. 17, 25
(TISTM/EJH) OTS price $2.60

Central Inst. for Industrial Research (Norway).
METALLIC OXIDE PHASES OF NIOBIUM AND TANTALUM. II. METALLOGRAPHIC STUDIES,
by N. Norman, P. Kofstad, and O. J. Krudtaa.
Oct 61, 20p. incl. illus. 16 refs. (Technical note no. 2; SI Pub. no. 337)
(Grant AF-EOAR-61-42)
(ARL-239) Unclassified report

DESCRIPTORS: (*Niobium, *Tantalum, High temperature research, Oxidation, *Phase studies, Niobium compounds, Tantalum compounds, Oxides, X-ray diffraction analysis, Electron diffraction analysis, Microstructure.) Sheets, Powder metals.

Metallographic studies on polished and etched specimens show that NbO sub x and TaO sub y cannot be distinguished from the metal phase. The isomorphous suboxides NbO sub z and TaO sub z form platelets in the metal. It appears that nucleation of the latter 2 suboxides is favoured at sites of strain or imperfections in the metals. (Author)

AD-273 220 Div. 17, 25
(TISTM/BRW) OTS price $4.60

General Dynamics/Astronautics, San Diego, Calif.
MEASUREMENT OF THE ELASTIC PROPERTIES OF 300 SERIES STAINLESS STEELS AT CRYOGENIC TEMPERATURES BY ULTRASONIC TECHNIQUES,
by James F. Haskins. 24 Apr 61, 45p. incl. illus. 219 refs. (Rept. no. ERR-AN-055)
(Contract AF 33(616)7984)
Unclassified report

DESCRIPTORS: (*Elasticity, Measurement of *Stainless steel by Ultrasonics at Cryogenics, Temperature.) (Metals, Sound transmission, Velocity, Copper.) Low temperature research, Solid state physics, Test equipment, Instrumentation, Alloys.

Pulsed high frequency sound waves were used to measure the velocity of sound propagation in metals at frequencies of 2.25 to 10 mc. The longitudinal and shear wave velocities were used to calculate the elastic constants of the materials. Types 303 and 321 stainless steel and Cu were investigated. Results indicate a low temperature maximum in the longitudinal wave velocity of 321 stainless steel. No difference was observed in the longitudinal wave velocity between 303 and 321; however, the shear wave velocity of 303 was higher than that of 321. (Author)

AD-273 221 Div. 17, 25, 30
(TISTM/BRW) OTS price $8.60

General Dynamics/Astronautics, San Diego, Calif.
A STUDY OF AUSTENITE DECOMPOSITION AT CRYOGENIC TEMPERATURES.
Rept. for 1 Jan-31 Dec 60,
by J. F. Watson and J. L. Christian. 9 June 61, 86p. incl. illus. tables, 37 refs. (Rept. no. ERR-AN-057)
(Contract AF 33(616)7984)
Unclassified report

DESCRIPTORS: (*Stainless steel (300 Series), *Phase transitions, *Austenite, Decomposition, Martensite, Measurement, Cryogenics, Temperature, Deformation, Mechanical properties, Magnetic properties.) (Test methods, Test equipment, Ferromagnetism.) Low temperature research, Solid state physics, Alloys.

The fundamental factors controlling the austenite to martensite solid state phase transformation in the 300 series austenitic stainless steels were studied over the temperature range of 78 to -423 F. These fundamental factors were temperature, plastic strain, and austenite stability (i.e., chemical composition). Tests were performed at 78, -100, -320, and -423 F on specimens cold-rolled between 40 and 80%. The alloys studied were AISI Types 301, 302, 304 ELC, and 310 which covered a wide range of austenite stability. A magnetic technique for measuring martensite content in metastable austenitic stainless steels was developed, and used to determine the extent of the austenite to martensite solid state phase transformation. This technique was selected after investigating alternative methods including metallography, X-ray diffraction, and density. The magnetic technique offered the advantage of not being effected by cold work in the samples, which caused difficulty in each of the other techniques. (Author)

AD-273 223 Div. 17, 20
(TISTM/GEC) OTS price $8.60

General Dynamics/Astronautics, San Diego, Calif.
A STUDY OF THE EFFECTS OF NUCLEAR RADIATION ON HIGH-STRENGTH AEROSPACE VEHICLE MATERIALS AT THE BOILING POINT OF HYDROGEN (-423 F),
by J. F. Watson, J. L. Christian and J. W. Allen. 27 Sep 61, 88p. incl. illus. tables, 22 refs. (Rept. no. ERR-AN-085)
(Contract AF 33(616)7984)
Unclassified report

DESCRIPTORS: (*Radiation effects of Nuclear energy on Alloys, *Stainless steel (301) (310), *Titanium alloys (A110AT), *Aluminum alloys (2014-T6), Cryogenics, Liquefied gases, Hydrogen.) (Tests, Mechanical properties, Tensile properties, Elasticity, Deformation.)

A study was made of the effects of a combined environment of cryogenic temperature and nuclear radiation on structural materials by exposing them to an integrated fast neutron flux of about 2 x 10 to the 17th power nvt while being soaked in liquid H. Tensile tests were made at -423 F. The alloys studied were 301 and 310 stainless steel, 5 Al-2 1/2 Sn Titanium (A110AT), and 2014-T6 aluminum. Results include yield strength, tensile strength, elongation, notch tensile strength, and the tensile strength of simple heliarc butt welded joints. Samples were tested in unirradiated and irradiated conditions at 70 and -423 F. The greatest effect occurred in tensile strength and elongation. Irradiation severely restricted the amount of plastic deformation before fracture. Radiation induced embrittlement of the body centered martensite phase of 301 stainless steel. (Author)

AD-273 227 Div. 17, 25
(TISTM/GEC) OTS price $1.25

Indiana Steel Products Co., Valparaiso.
THE CRYSTAL LATTICES IN ALNICO PERMANENT MAGNETS STUDIED BY TRANSMISSION ELECTRON DIFFRACTION,
by K. J. Kronenberg. Nov 61, 40p. incl. illus. tables, 17 refs.
(Contract AF 33(616)7287, Proj. 7371)
(ASD TR 61-498)
Unclassified report

DESCRIPTORS: (*Magnets, *Magnetic materials, *Single crystals, *Lattices, Alloys, Iron alloys, Nickel alloys, Cobalt alloys, Aluminum alloys, Processing, Precipitation, Phase studies, Casting, Heat treatment.) (Test methods, Electron microscopy, Electron diffraction analysis.)

Alnico permanent magnet materials were investigated with transmission electron metallography. A method was developed for producing samples which were thin enough for the transmission of 80 KV-electrons. The precipitation process in Alnico V was studied in the material itself by transmission electron diffraction. The cast material had a body centered cubic crystal lattice with a pronounced superstructure. After complete heat treatment a precipitated phase was found predominant in Alnico V with a body centered cubic crystal lattice which formed a sort of single crystal with a mosaic structure. The diffraction patterns of various technically important Alnico materials were compared. The cast alloys had crystal lattices with similar degrees of order and superstructure. Their lattice parameters varied with the compositions of the alloys between 3.16 and 2.80 angstroms. After heat treatment, a precipitated phase with

a body centered cubic lattice was found in all these alloys. The precipitates in the different alloys were similar in composition since they all have the same lattice parameter of 2.88 angstroms. (Author)

AD-273 232 Div. 17, 25
(TISTM/BRW) OTS price $4.60

Illinois U., Urbana.
METAL-GAS EQUILIBRIUM AND THE NIOBIUM-NITROGEN SOLID SOLUTION,
by J. R. Cost and C. A. Wert. 15 Jan 62, 45p. incl. illus. 21 refs.
(Contract AF 49(638)672)
(AFOSR-2067) Unclassified report

DESCRIPTORS: (Metals, *Niobium, Gases, *Nitrogen, *Phase studies, Thermodynamics, Pressure, Temperature.) (Heat of formation, Heat of solution, Solids, Solutions, Solubility, Blackbody radiation, Data.) (X-ray diffraction analysis, Microscopy, Lattices, Precipitation, Internal friction, High temperature research.) Solid state physics, Metallurgy.

A method is developed for displaying in a 3-dimensional plot the pressure-temperature-composition equilibrium for a metal-gas system. The coordinates used are log P, 1/T, and log x. In this coordinate system, several simplications result over the ordinary P-T-x plot. A series of measurements on Nb-N equilibrium were made to see how well this real metal-gas system obeys the ideal system. The Nb-N binary obeyed the rules for ideal behavior very well. The major features of the binary may be described by a small number of thermodynamic parameters. (Author)

AD-273 287 Div. 17
(TISTM/BRW) OTS price $3.60

Armour Research Foundation, Chicago, Ill.
DEVELOPMENT OF DUCTILE BERYLLIUM COMPOSITES.
Final rept., 23 Dec 60-22 Dec 61,
by Frank Crossley and R. J. Van Thyne. 1 Feb 62, 29p. incl. illus. tables, 7 refs. (Rept. no. ARF 2212-6)
(Contract NOw 61-0370-c)
Unclassified report

DESCRIPTORS: (Brittle materials, *Beryllium alloys, *Aluminum alloys, *Silver alloys, Germanium alloys, Preparation, Sintering.) (Powder alloys, Powder metals, Powder metallurgy, Bonding, Binders, Processing.) (Heat treatment, Mechanical properties.)

An effort to produce ductile Be composites by liquid-phase sintering is reported. Ductility in a predominantly Be composite was sought through the attainment of a structure in which Be particles are enveloped in a ductile metallic matrix. As the result of the investigation of Al-Ag binary alloys, Al-40 to 50% Ag compositions were added to the Ag-5 to 8% Al compositions as candidate matrices satisfying the requirement that the flow stress of the matrix be matched to that of the principal phase. Composites produced for final evaluation contained defects originating from the processing schedule. The feasibility of applying liquid-phase sintering to produce Be composites was established. However, to obtain a fair evaluation of the question of ductility improvement, it is necessary to develop compacting and sintering procedures which will yield sound material for mechanical testing. (Author)

AD-273 292 Div. 17, 25
(TISTM/BRW) OTS price $3.60

Dynamic Properties Lab., Calif. Inst. of Tech., Pasadena.
THE INITIATION OF PLASTIC FLOW AND FRACTURE IN METALS.
Final rept.,
by D. S. Wood and D. S. Clark. Jan 62, 27p. 34 refs.
(Contract DA 04-495-ORD-1631, Proj. 1235)
(AROD rept. no. 1235:10) Unclassified report

DESCRIPTORS: (*Metals, *Fracture (Mechanics), Elasticity, Plasticity, *Plastic flow, Deformation, Grains (Metallurgy).) (Steel, Zinc, Single crystals.) Brittle materials.

The initiation of plastic flow and fracture in metals was studied. A list of reports and publications resulting from these studies is presented. The investigations led to new knowledge and an improved understanding of the mechanisms of the initiation of plastic flow and fracture in metals. A more complete picture of the phenomenon of delayed yielding in mild steel was obtained which accounts for the influence of grain size and points out the importance of C concentrated in the grain boundaries. Quantitative knowledge of the influences of temperature, rate of loading, and notch geometry upon the initiation of brittle fracture in fine grained mild steel was developed; this knowledge is capable of making an accurate prediction of the transition temperature in a standard notched bar impact test from other measureable properties of the steel. More work is required before similar knowledge of brittle fracture in coarse grained steel can be developed. A new mechanism of plastic deformation of Zn single crystals was conceived by which the discovery of slip on non-basal planes can be explained. (Author)

AD-273 314 Div. 17, 26
(TISTM/BRW) OTS price $.50

National Aeronautics and Space Administration, Washington, D. C.
SOME EFFECTS OF VARIATION OF HOT-PRESSING TEMPERATURE UPON THE AGGLOMERATION OF MgO IN A DISPERSION STRENGTHENED NICKEL-MgO ALLOY,
by Robert J. Schafer, Max Quatinetz and John W. Weeton. Mar 62, 17p. incl. illus. table, 5 refs.
(Technical note D-1167)
Unclassified report

Also available from NASA, Wash. 25, D. C., as NASA Technical note D-1167.

DESCRIPTORS: (Alloys, Metals, Oxides, *Dispersion hardening of *Nickel alloys with *Magnesium compounds, Mixtures, Ball mills, Powder metals, Powder metallurgy, Processing, Sintering, Extrusion.) Metal forming presses, Density, Chemical impurities.

Agglomeration of oxides in a Ni-MgO composite increased with hot-pressing temperatures ranging from 1800 to 2400 F and was influenced by the presence of impurity oxides. The most encouraging result of the investigation was that the hot-pressing method seemed adaptable to producing a dispersoid in a metal matrix approaching dimensions in those of Al - Al2O3 SAP-type alloys. The finest dispersions were obtained in extruded products by using the lowest hot-pressing temperature prior to extrusion and the finest metallic powders. (Author)

Division 18-MILITARY SCIENCES AND OPERATIONS
Division 19-NAVIGATION

AD-273 410 Div. 17, 4, 26
(TISTM/BRW) OTS price $3.50

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson Air Force Base, Ohio.
HEATING OF METALS AND ALLOYS IN ELECTROLYTES, by I. Z. Yasnogorodskiy. 21 Feb 62, 190p. incl. illus. tables (Trans. no. FTD-TT-61-70 of Nagrev Metallov I Splavov v Elektrolite, Moskva, pp. 1-125, 1949)
Unclassified report

DESCRIPTORS: (*Alloys, *Metals, *Heating in *Electrolytes by Electric currents or Electric potential, Textbooks.) (Industrial equipment, Automation, Industrial plants, USSR.) (Hardening, Soldering, Welding, Metal forming presses.)

Contents:
The physical principles governing electrical heating in an electrolyte
Methods of heating in an electrolyte
Construction of production installations for heating in an electrolyte
Areas of application of electroheating in an electrolyte

AD-273 417 Div. 17, 12, 1
(TISTM/BRW) OTS price $8.60

General Dynamics/Fort Worth, Tex.
ELEVATED TEMPERATURE METALS FOR FUTURE HIGH SPEED VEHICLES,
by R. E. Johnson. 22 Dec 59, rev. 20 Dec 60, 85p. incl. illus. tables, 57 refs. (Rept. no. ERR-FW-046, rev. of FZM-1151)
(Contract AF 33(657)7248)
Unclassified report

DESCRIPTORS: (High temperature research, Alloys, Metals.) (*Heat resistant alloys for Supersonic planes, Spaceships, Satellite vehicles, Mechanical properties, Physical properties, Creep, Rupture, Costs.) Iron alloys, Cobalt alloys, Nickel alloys, Titanium alloys, Beryllium alloys.

The report covers mechanical property data at temperatures up to 1700 F as well as physical properties on 24 alloys representing Fe, Co, Ni, Be and Ti base alloys. Additional data are included on availability, cost, fabrication and joining of these alloys. The alloys include PH 15-7Mo, 17-4PH, Vascojet 1000, U.S.S. 12 MoV, A-286, AF-71, Unitemp 212, D-979, Inconel X, 700, 718, and 713 C, Incoloy 901, Udimet 500, 600, and 700, J-1500 (M-252), J-1610 (Rene' 41), Waspalloy, Hastelloy R-235, J-1570, RS-140 (5Al-4FeCr)Ti alloy, 6Al-4V-Ti alloy, 20 Cb-17.5 Al-Ti alloy, Beryllium, Haynes #36, GEX-63, and Nicrotung. (Author)

AD-273 436 Div. 17, 25
(TISTM/BRW) OTS price $1.10

Oklahoma U. Research Inst., Norman.
GRAIN BOUNDARY DIFFUSION IN METALS.
Summary status rept.,
by W. R. Upthegrove. 15 Feb 62, 7p. incl. illus. tables.
(Contract Nonr-98204, Proj. NR 013-611)
Unclassified report

DESCRIPTORS: (Metals, Metallic crystals, *Grains (Metallurgy), Diffusion, Chemical impurities, Lattices, *Lead, Tracer studies, Crystals, Autoradiography.)

Studies were made to obtain needed critical data for grain boundary diffusion phenomena and an improved understanding of these phenomena. Investigations were initiated to determine the orientation dependence of grain boundary self-diffusion of Pb in low angle symmetrical tilt and symmetrical twist boundaries and to determine the effects of impurity content, size and valence on diffusion in boundaries of constant misfit. Bicrystals of the desired misfit and impurity content were grown by a modified Chalmer's technique. Radioactive Pb-210 was diffused along the boundary and into the lattice, and the resultant concentration contour was established by high resolution autoradiography. Data were analyzed to determine lattice diffusion coefficient and effective grain boundary diffusion coefficients. (Author)

18. MILITARY SCIENCES AND OPERATIONS

AD-273 166 Div. 18
(TISTB/LH) OTS price $2.60

Army Artillery and Missile School, Fort Sill, Okla.
GUERRILLA WARFARE. AN ANNOTATED BIBLIOGRAPHY. 21 Feb 62, 29p. (Special bibliography no. 27)
Unclassified report

DESCRIPTORS: (*Bibliography, Guerrilla warfare.) (Military operations, Propaganda, Warfare.)

19. NAVIGATION

AD-273 092 Div. 19
(TISTW/DLW) OTS price $9.60

Sperry Gyroscope Co., Great Neck, N. Y.
STUDY AND DEVELOPMENT OF A NON-FLOATED INERTIAL QUALITY GYROSCOPE.
Final rept., Mar 60-Dec 61,
by E. Luber and M. Klemes. Feb 62, 1v. incl. illus. tables, 1 ref.
(Contract AF 33(616)6974, Proj. 4431)
(ASD TDR 62-80) Unclassified report

DESCRIPTORS: (*Gyroscopes, Gyro stabilizers, Ball bearings, Gimbals, Design, Sensitivity, Drift, Tests.) Inertial guidance.

The design, development, and testing are described of two small, non-floated, single-degree-of-freedom gyroscopes of inertial quality which employ a ROTORACE gimbal suspension. Descriptions are included of tests performed on these units which show that the following typical performance characteristics were obtained: (1) a random drift rate of 0.03 degrees/hr rms, (2) a g-sensitive drift rate of below 0.2 degrees/hr/g, and (3) a g sq-sensitive drift rate of 0.03 degrees/hr. (Author)

AD-273 133 Div. 19, 5, 8
(TISTE/NTM) OTS price $7.60

Laboratory for Electronics, Inc., Boston, Mass.
EMS MINIATURIZATION STUDY.
Final rept., 5 July 61-5 Jan 62,
by Edward P. Farnsworth and Frank Marsden.
5 Jan 62, 65p. incl. illus. tables (Rept. no. C-907-A)
(Contract AF 19(604)8841, Proj. 2124)
(AFCRL 62-54) Unclassified report

DESCRIPTORS: (*Miniature electronic equipment, Mobile, *Air traffic control systems, *Communication equipment, Radio navigation, Trailers.) (*Radio communication systems, Teletype equipment, Transmitter receivers, Facsimile receiver converters, Facsimile recording systems, Microwave relay systems, Radio relay systems, Ultra high frequency, Very high frequency, Reduction, Packaging, Reliability.)

A study was made to determine which items of equipment specified for the Augmented 4-Wheels System and required in the 1965-1975 EMS System can be reduced in size by miniaturization or development effort, to provide a more compact, mobile, air transportable system in the future. Included are considerations of the economics of micro-miniaturization, over-all equipment size reduction achievable, maintenance and reliability problems, and effect on performance characteristics. Recommendations can be followed to reduce the size and weight of point-to-point long range communications facilities, teletype printing, transmitting and terminal equipment, weather map facsimile recorders and SCFM converters, ground-to-air UHF and VHF transceivers, and microwave radar and radio relay links. Tables are included showing characteristics of equipment evaluated, bibliography of reference literature, and a list of military and civilian personnel consulted. (Author)

20. NUCLEAR PHYSICS AND NUCLEAR CHEMISTRY

AD-273 026 Div. 20, 16
(TISTB/CCH) OTS price $8.60

Armour Research Foundation, Chicago, Ill.
MEASUREMENT OF DOSE DISTRIBUTION PRODUCED BY HIGH ENERGY ELECTRONS WHICH CAN BE APPLIED TO THE DOSE DISTRIBUTION CHARACTERISTICS OF THE ACCELERATORS UNDER A WIDE VARIETY OF CONDITIONS.
Rept. no. 4 (Final) 2 Jan 60-30 June 61,
by P. Y. Feng. 30 June 61, 90p. incl. illus. tables.
(Contract DA 19-129-qm-1526, Proj. 7-84-01-002)
Unclassified report

DESCRIPTORS: (*Electrons, *Energy, *Radiation effects, *Food, Carbohydrates, Skin.) (*Gamma rays, Dosage, Compton scattering, Theory.)

The distribution of radiation doses produced by high energy electrons in food or food-like systems is being investigated. Radiation dose distribution is being studied in a variety of heterogeneous systems. An extensive series of electron irradiation experiments, covering an energy range of 1 17.5 Mev, and for heterogeneous systems with a carbohydrate as the food-like phase and various materials was carried out, and a method of estimating the dose distribution in such systems based on theoretical principles was developed. Experimental and theoretical results showed that variations in the macroscopic radiation dose distributions in common irradiated food packages will usually not exceed a few percent. In addition, such variations will be further reduced in either flow or rotating systems. A theoretical study of the radiation dose distribution in gamma irradiated heterogeneous systems was also carried out to establish the procedures needed for a study of the electron irradiated systems. Theoretical studies lead to a method of estimating the dose distribution in gamma irradiated systems with results comparing favorably with the experimental data obtained in another laboratory. (Author)

AD-273 146 Div. 20, 12
(TISTP/JW) OTS price $15.50

Pesco Products Div., Borg-Warner Corp., Bedford, Mass.
INVESTIGATION OF PARAMETERS WHICH AFFECT THE DESIGN OF A LIQUID HYDROGEN MISSILE FEED SYSTEM.
Final rept., July 59-Dec 60,
by G. H. Caine, S. Prelowski and others. Dec 60, 109p. incl. illus. tables, 9 refs.
(Contract AF 33(616)5810, Proj. 3084)
(AFFTC TR 61-5)
Unclassified report

DESCRIPTORS: (Fluid mechanics, *Liquid rocket propellants, *Hydrogen.) (Boiling, Turbulence, Fluid flow.) (*Fuel injection, Fuel tanks, Design.)

This report includes:
Georgia Inst. of Tech. Engineering Experiment Station, Atlanta.
ANALYTICAL INVESTIGATION OF TWO-PHASE VAPOR-LIQUID RATIO MEASURING SYSTEMS AND TWO-PHASE FLOW LITERATURE SURVEY SUPPLEMENT.

Since liquid hydrogen has not been used to any great extent in present day aircraft or missiles, it was necessary to explore certain basic areas of fluid dynamics and thermodynamics in the fluid feed system. Phases investigated encompassed items, such as single phase, high velocity flow in fuel lines, turbulence and boiling in missile tanks, and a study of the phenomenon of two phase flow. Also considered was the determination of an optimum feed system with a significant effort concentrated on the boost pump area. Boost pump tests in boiling liquid hydrogen under conditions of pump inlet submergence of only a few inches of fluid, with inlet velocities up to 40 fps, impeller peripheral velocities to 420 fps, and with high heat leaks to 24 btu/sq ft/min, and with vapor formation near the pump inlet are discussed. Information is presented on the calibration of a turbine type and an orifice type flowmeter in liquid hydrogen. (Author)

AD-273 158 Div. 20, 30
(TISTP/TL) OTS price $11.50

Stanford Research Inst., Menlo Park, Calif.
FEASIBILITY OF SIMULATING THE MECHANICAL EFFECTS OF A NUCLEAR EXPLOSION USING NON-NUCLEAR EXPLOSIVES.

Final rept.,
by J. K. Crosby, J. O. Erkman and others.
31 Dec 61, 140p. incl. illus. tables, 25 refs.
(Contract DA-49-146-XZ-043)
(DASA-1264) Unclassified report

DESCRIPTORS: (*Feasibility studies on *Simulation of *Ground effect, Motion from Surfaces or Underground explosions, *Nuclear explosions using Non nuclear explosives.) (Gases, Detonation, Shock waves.)

The feasibility of simulating ground motion produced by a nuclear detonation in or near the ground surface was established. In particular, the simulation of the physical input necessary to produce the ground motion in a restricted volume sufficiently great to encompass a buried structure was investigated. The volume in the ground affected by the detonation is divided into two regions, one affected primarily by direct coupling and the other affected indirectly, via the air shock. The simulation in each region has been treated as a separate and independent problem. In both cases the effects to be duplicated are taken to be those calculated from direct coupling and air shock. (Author)

AD-273 169 Div. 20, 17
(TISTM/GEC) OTS price $1.10

General Dynamics/Astronautics, San Diego, Calif.
REENTRY OF NAP REACTOR BERYLLIUM REFLECTORS; EFFECT OF FAST NEUTRON PRODUCED INTERSTITIAL HELIUM NUCLEI,
by A. Vampola. Mar 62, 6p. 11 refs.
(Contract AF 29(601)4893, Proj. 1831)
(AFSWC TDR 62-15) Unclassified report

DESCRIPTORS: (*Neutron bombardment of *Beryllium, Reflectors, Helium.) (Beryllium, Mechanical properties, Temperature, Tensile properties, Elasticity, Density, Thermodynamics, Melting, Boiling, Heat of fusion, Specific heat, Thermal conductivity, Thermal expansion.) (Neutron flux density, Mass number.) (Re-entry aerodynamics, Radiation effects, Reactor reflector materials, Beryllium, Hazards.)

This report discusses the effect of interstitial He nuclei produced in the Be by fast neutrons as a possible mechanism of Be degradation and hence a contributing mechanism of dispersal. The sizable cross sections for production of He4 under fast neutron bombardment of Be indicated that interstitial He nuclei would be produced within the Be. It was shown that the total gas volume involved was too small to produce significant changes in density, yield strength or brittleness of the Be. The irradiated reflector metal, therefore, should react in the same manner as unirradiated Be upon reentry. (Author)

AD-273 254 Div. 20, 25
(TISTP/WH) OTS price $.50

Naval Research Lab., Washington, D. C.
THE NRL AUTOMATIC, SINGLE-CRYSTAL, NEUTRON DIFFRACTOMETER,
by E. Prince. 5 Mar 62, 15p. incl. illus.
1 ref. (NRL rept. no. 5744)
Unclassified report

DESCRIPTORS: (Research reactors, *Neutron diffraction analysis of *Single crystals and Crystal structure, Magnetic properties.) (Automation, Digital computers, Programming.) (*Neutron beams, Monochromatic light, Diffraction gratings, Optical equipment.)

An automatic diffractometer for the study of the physics of crystalline solids by means of neutron diffraction has been completed at the NRL Nuclear Reactor Facility. It was designed for maximum versatility in studying the structure of materials, with special emphasis on magnetism, but also with an emphasis on metallurgical and structural chemical problems. On the basis of the initial experiments it appears that useful diffraction data is possible from crystals as small as 1 cubic millimeter, although 10 cubic millimeters is probably a more suitable size. Automatic programming brings the specimen crystal into the position for reflection and rotates the crystal and counter through the Bragg angle by independent adjustments, each of which is provided with an electrical readout to a digital recorder. A computer program does all preliminary processing of data tapes. (Author)

AD-273 279 Div. 20, 30
(TISTP/WH) OTS price $.50

Watertown Arsenal Labs., Mass.
THE FEASIBILITY OF USING NEUTRON RADIOGRAPHY AS A NONDESTRUCTIVE TESTING TECHNIQUE,
by Arnold W. Schultz and William Z. Leavitt.
Dec 61, 13p. incl. illus. tables, 14 refs.
(Rept. no. WAL TR 142/67)
(DA Proj. no. 593-32-007)
Unclassified report

DESCRIPTORS: (*Thermal neutrons, *Neutron beams, *Radiography, Industrial radiography, Ordnance, Materials.) Feasibility studies.

A preliminary study was conducted to determine the feasibility of using neutron radiography for examining ordnance materials. Depleted uranium and 4140 steel castings in various thicknesses were examined. In addition, a thin section of beryllium, a grasshopper and a cricket were radiographed to illustrate the ability of neutrons to determine defects in low-density materials. (Author)

AD-273 412 Div. 20
(TISTP/TL) OTS price $13.00

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson Air Force Base, Ohio.
STUDY OF CRITICAL PARAMETERS FOR REACTOR SYSTEMS (COLLECTION OF ARTICLES) (Issledovaniya Kriticheskikh Parametrov Reaktornykh System).
21 Feb 62, 182p. incl. illus. tables, refs.
(Trans. no. FTD-TT-61-124 of Gosudarstvennoye Izdatel'stvo Literatury V Oblasti Atomnoy Nauki i Tekhniki, Moskva, pp. 3-117, 1960)
Unclassified report

DESCRIPTORS: (*Power reactors, *Spheres, Particles, Velocity, Diffusion, Scattering, Reflection.) (Heterogeneous reactors, *Boiling water reactors, *Nuclear power plants, *Kinetic theory.) (Graphite, Beryllium, Plutonium compounds, Statistical distributions, Statistical functions, Polynomials, Functions, Integral equations, Numerical methods and procedures, Tables.)

Contents:
Exact solutions of single velocity kinetic equa-

tion and their application in calculating diffusion problems (Improved Diffusion Method)
Approximate method of calculating critical masses of spherical reactors with infinite reflectors
Even approximation in spherical harmonic method
Critical masses of uranium graphite reactors
Critical masses of uranium-beryllium reactors
Critical masses of water mixtures of uranium and plutonium compounds
Interaction of systems of fissile matter in a scattering medium
Experimental study of interaction of two subcritical reactors
Calculation of sectionalized nuclear power plants

AD-273 418 Div. 20, 17,
(TISTN/EJH) OTS price $1.75

General Dynamics/Fort Worth, Tex.
THE EFFECTS OF NUCLEAR RADIATION ON AIRCRAFT MATERIALS,
by Paul W. Vineberg. 10 Mar 60, 62p. incl. tables, 9 refs. (Rept. no. FZN-1943)
(Contract AF 33(657)7248)
Unclassified report

DESCRIPTORS: (*Radiation effects, X-rays, Gamma rays, Alpha particles, Neutrons, Beta particles, Materials, Metals, Semiconductors, Optical materials, Glass, Plastics, Elastomers, Organic materials, Inorganic substances, Electrical equipment, Electronic equipment, Electric insulation.) (Nuclear reactions, *Steel, *Aluminum alloys, *Copper alloys, *Nickel alloys, Alloys.) (Radiobiology, *Radiation hazards, Dosage.) (Aircraft, Nuclear propulsion.)

Contents:
Types of radiation (x-rays, gamma radiation, beta radiation, alpha radiation, neutrons)
Radiation damage (Al, Cu, iron and steel, semiconductors, optical materials, elastomers, plastics, organic fluids, electrical insulation, electrical equipment, electronic equipment)
Induced radioactivity
Health physics (radiation units, radiation hazards, dosages, radiation tissue damage, symptoms and effects of radiation damage, dosimeters and film badges)

AD-273 426 Div. 20
(TISTP/FR) OTS price $8.60

California U., Los Angeles.
BEAM STUDIES ON THE U.C.L.A. 50 MEV SPIRAL - RIDGE CYCLOTRON,
by David J. Clark. Jan 62, 93p. incl. illus. 32 refs.
(Contract Nonr-23344)
Unclassified report

DESCRIPTORS: (*Cyclotrons, Cyclotron magnets, Magnetic fields, Radiofrequency oscillators.) (Proton beams, Protons, Atomic orbitals, Ion beams.)

The UCLA 50 Mev cyclotron is the first of the new generation of spiral ridge cyclotrons operating in the medium energy region. The development of the magnetic field of this cyclotron is described. A satisfactory internal beam of 2 microamperes at 5% duty cycle was obtained in the spring of 1961. The principal parameters of the final magnetic field are shown in a series of figures. Orbit calculations based on this magnetic field predicted satisfactory beam stability and isochronism. A series of experimental beam observations and measurements were compared with the calculations wherever possible. The beam intensity obtained from probe measurements and photographs agrees qualitatively with the calculations. Both the calculations and experiments indicate a simultaneous phase loss and vertical blow-up from the coupling resonance at the edge of the cyclotron. The vertical and radial betatron oscillation frequencies were measured by the RF knockout technique. The values agree within the estimated uncertainties with the computer calculations. Other beam measurements were made on the dependence of beam current on dee-voltage, and the amplitude of radial oscillations. (Author)

21. NUCLEAR PROPULSION

AD-273 244 Div. 21, 17
(TISTM/BRW) OTS price $2.50

Martin Co., Baltimore, Md.
ANPP CORROSION PROGRAM.
Final summary rept.,
by I. C. Mayes and J. McGrew. Feb 62, 106p. incl. illus. tables, 12 refs. (Rept. no. MND-E-2727)
(Contract DA 44-009-eng-3581)
Unclassified report

DESCRIPTORS: (*Nuclear power plants, *Heat exchangers, Materials, *Corrosion research.) (Nickel, Nickel alloys, Copper alloys, Chromium alloys, Stainless steel, Steel, Molybdenum alloys.) (Tests, Model tests, Test methods, Corrosive liquids, Steam, Chlorides.)

An invetigation was made to determine the suitability of various materials for heat exchanger fabrication in nuclear power plants and the effects of various water treatments on the performance of these materials. Static autoclave and dynamic loop tests were performed. The results showed that Inconel is superior to all other materials tested in simulated nuclear service. The criteria of comparison were: resistance to general corrosion, pitting corrosion, crevice corrosion and susceptibility to stress corrosion cracking. (Author)

Division 22 - ORDNANCE
22. ORDNANCE

AD-273 019 Div. 22, 12, 10
(TISTA/LSK) OTS price $21.00

Frankford Arsenal, Philadelphia, Pa.
UNCLASSIFIED SESSION PAPERS. VOLUME I. PROPELLANT ACTUATED DEVICES SYMPOSIUM JUNE 14-16, 1961, SPONSORED BY CHIEF OF ORDNANCE, DEPARTMENT OF THE ARMY.
1961, 353p. incl. illus. tables.
Unclassified report

DESCRIPTORS: (*Explosive actuators, *Symposia.) (Explosive actuators related to Ejection seats, Jettisonable cockpits, Catapults, Space capsules, Gas generating systems, Primers, Control systems, Propellants, High temperature research, Aging, Deterioration, Reliability, Ejection.) (Propellants, Quality control, Production.) (Bombs, Parachutes.) (Electronic relays, Time delay relays, Timing circuits.) (Exploding cables, Electric detonators.)

Contents: Propellant actuated devices and the Transportation Corps; Martin-Baker MK-J5 ejection seat; BuWeps cartridge actuated devices program; PAD at USATRECOM; PAD at DOFL; Rocket catapults; Control rod concept for controlling onset rate in ejection catapults; Maximum environmental temperatures for MK 1 Mod 0 rocket catapults; Modulated thrust escape rocket; Decoy packaging and launching; Gas generation systems; PAD in retarded training bombs and parachute test vehicles; Solid state electronic time delay for actuating PAD; Factorial experiment and box technique for ballistic devices; Propellants for PAD; High temperature resistant propellants for PAD; High temperature percussion primer; Exploding wire initiators; Solid state aging device; Problems with rockets and pyrotechnics for Project Mercury; Crew escape for advanced aerospace vehicles; Use of PAD in space; Logistic support of PAD; Environmental factors for PAD; Quality and reliability control; and Off-on hot gas actuator to a directional control system.

AD-273 060 Div. 22
(TISTP/AW) OTS price $5.60

Beckman and Whitley, Inc., San Carlos, Calif.
PHENOMENA OF PENETRATION IN LIGHT WEIGHT RIGID PERSONNEL ARMOR MATERIALS.
Final rept., pt. A,
by J. W. Corcoran and J. N. Kelly. 12 Dec 61, 31p. illus. tables, 13 refs. (Rept. no. RD 63)
(Contract DA 19-129-qm-1574)
Unclassified report

Original contains color plates; all ASTIA reproductions will be in black and white. Original may be seen in ASTIA Hq.

DESCRIPTORS: (*Projectiles, Aluminum, Penetration, Body armor, Stresses, Impact shock.) (Bullet wounds, Simulation.)

Tests were undertaken to provide data on the behavior of projectiles impacting light armor materials, at velocities in the range 1000 ft/sec to 4000 ft/sec. The report includes the results of tests of spherical and cylindrical aluminum projectiles impacting aluminum plates and similar projectiles impacting a light armor built-up out of corrugated aluminum sheets. It concludes with a description of a new method for determining material properties at high strain rates. This method was used to obtain estimates of the yield stress of 2024 T4 aluminum at strain rates from 2900/sec to 13,600/sec. (Author)

AD-273 162 Div. 22
(TISTW/JRG) OTS price $4.60

Whirlpool Corp., Evansville, Ind.
A TEST OF THE MUZZLE BURST FEATURE OF THE MT T369 FUZE AT ZONE 10 CHARGE FROM THE 105MM M2A2E2 HOWITZER USING T388 EXTENDED RANGE (MODIFIED) PROJECTILES.
Special rept. on MT T369 Fuze Test 105MM Howitzer Application Test dated 12, 13, 14 Dec 61,
by Charles W. Haag and Clarence C. Clarke.
14 Dec 61, 8p. illus.
(Contract DA 33-008-501-ORD-1800)
Unclassified report

DESCRIPTORS: (Howitzers, Guns, *Projectile fuzes, *Time delay fuzes, *Point detonating fuzes, Detonators, Photographic analysis, Tests.)

Twenty-six inert T388 shells were equipped with MT T369 Fuzes and tested for muzzle burst action. Two fuze lots were tested. Both were equipped with a T37 detonater instead of a standard M47 detonator. All fuzes from both lots functioned consistently between 8 and 10 ft from the muzzle. The flash from the M47 detonator used in the fuzes on previous tests was not sufficient to ignite the M7 relay located at the other end of the clock mechanism. The T37 detonator or another detonator with higher output than the M47 detonator will have to be incorporated in the MT T369 Fuze for proper muzzle burst operation. (Author)

AD-273 193 Div. 22, 20
(TISTW/EET) OTS price $5.60

Air Force Proving Ground Command, Eglin Air Force Base, Fla.
EVALUATION OF THE A/A24D-5(XI-1) COOPERATIVE PROXIMITY SCORER,
by Russell A. Bunn. Feb 62, 48p. incl. illus. tables, 8 refs. (Technical documentary rept. no. APGC TDR 62-9)
(Proj. 7841W14)
Unclassified report

DESCRIPTORS: (*Aircraft fire control systems, *Firing error indicators, Effectiveness, Reliability, Tests.) (Aerial targets, Target drones, Firing error indicators, Aircraft ammunition, *Rockets.) (Firing error indicators, Gamma rays, Radioactive isotopes, Radiation hazards.) (Pilots, *Radiation hazards.) (*Projectiles, Radioactivity, Rocket targets, Tracking.)

Tests were conducted to determine performance characteristics, reliability, and accuracy of the A/A24D-5(XI-1) cooperative proximity scorer. Ground firings of radioactively tagged 20mm munitions and airborne firings of tagged 5-in. HVAR's were used to determine the scoring and telemetry characteristics of the scorer. Possible radiation hazards associated with use of the scoring system were also investigated. It was concluded that the scorer in its tested configuration had a nominal 15-ft scoring envelope on the ground and in the air. It satisfactorily scored tagged munitions passing within its scoring envelope, but it also scored an excessive number of projectiles passing beyond 15 ft. The latter characteristic was considered unsatisfactory. It was also concluded that there was negligible radiation hazard associated with the scoring system. Recommendations include that the ability of the scorer to disregard tagged projectiles passing beyond its nominal scoring range be improved. (Author)

AD-273 206 Div. 22, 25, 9
(TISTW/EET) OTS price $3.60

Ballistic Research Labs., Aberdeen Proving Ground, Md.
DETONATION PROPERTIES OF PENTOLITE,
by Ralph E. Shear. Dec 61, 43p. incl. illus. tables, 13 refs. (BRL rept. no. 1159)
(DA Proj. no. 503-04-002)
Unclassified report

DESCRIPTORS: (*Hydrodynamics, Theory of Detonation.) (*Pentolite, Detonation, Velocity, Pressure.) (Detonation waves, Thermodynamics, Equations of state.) (*Explosives, Detonation, Mathematical analysis.) (Gases, Solids, Entropy.)

The hydrodynamic theory of detonation has been applied to determine the detonation velocity, pressure, and product composition and the isentropic expansion of the explosion products of pentolite. Hydrodynamic principles were applied to determine the initial pressure of the shock formed in air after completion of the detonation, and to calculate the pressure and velocity distribution behind the detonation wave. (Author)

AD-273 277 Div. 22, 25
(TISTW/JRG) OTS price $1.10

Davidson Lab., Stevens Inst. of Tech., Hoboken, N. J.
RESEARCH PROGRAM ON CONVERSION OF EXPLOSIVE ENERGY.
Quarterly progress rept., July-Sep 61,
by S. J. Lukasik. Sep 61, 7p. incl. illus. tables.
(Contract DA 28-017-501-ORD-3450)
Unclassified report

DESCRIPTORS: (*Explosives, Cesium compounds, Additives, *Explosions, Electrical conductance, Resistance, Electrical properties, Measurement.) (*Shaped charges, Penetration, Copper, Targets, Spectrographic analysis, Photographic analysis.) (*Capacitors, Design, Tests.)

The investigation of the effect of seeding explosives to enhance their electrical conductivity continued. Measurements of reaction zone resistivity using T-probes were made in both unseeded Comp B and in Comp B seeded with 1% cesium perchlorate. Effort in the shaped charge collision work was directed toward obtaining a time resolved spectrum of the event by means of a direct-view prism in front of the streak camera. The mechanical protection of the capacitor bank has been the subject of some work. Test firings of portions of the bank have been performed to check that the explosive loading will not exceed the allowable limits of the structure. (Author)

AD-273 315 Div. 22, 25
(TISTM/BRW) OTS price $.75

National Aeronautics and Space Administration, Washington, D. C.
MEASUREMENTS OF MOMENTUM TRANSFER FROM PLASTIC PROJECTILES TO MASSIVE ALUMINUM TARGETS AT SPEEDS UP TO 25,600 FEET PER SECOND,
by B. Pat Denardo. Mar 62, 30p. incl. illus. table, 8 refs. (Technical note D-1210)
Unclassified report

Also available from NASA, Wash. 25, D. C., as NASA Technical note D-1210.

DESCRIPTORS: (*Terminal ballistics of Plastics, *Projectiles on Aluminum alloys, Targets, Motion, Velocity, Measurement, Penetration, Impact shock.) Hypervelocity projectiles, Meteorites, Satellite vehicles.

Momentum transfer during impact at speeds from essentially 0 to 25,600 fps was measured by a simple ballistic pendulum. The impacting projectile was made of linear high-density polyethylene and its shape and mass were maintained constant throughout the experiment. The impacted target was made of 2024-T4 Al alloy. The resulting ratio of pendulum momentum to projectile momentum varied in an orderly fashion throughout the entire velocity range, reaching a minimum of 1.0 at about 3000 fps and increasing to 1.9 at the highest velocity of 25,600 fps. The change in mass of the target was also obtained, as were penetration data for this combination of materials. It was observed that the volume of the crater as measured directly was twice the volume of the crater as computed from the target mass loss at speeds above 10,000 fps. Below 10,000 fps, this ratio increased rapidly with decreasing velocity. (Author)

23. PERSONNEL AND TRAINING

AD-273 449 Div. 23, 28
(TISTB/AW) OTS price $2.75

Dunlap and Associates, Inc., Stamford, Conn.
THE MEASUREMENT OF ADVANCED FLIGHT VEHICLE CREW PROFICIENCY IN SYNTHETIC GROUND ENVIRONMENTS,
Rept. for 27 June 60-30 June 61 on Training, Personnel, and Psychological Stress Aspects of Bioastronautics,
by Alfred F. Smode, Alin Gruber and Jerome H. Ely. Feb 62, 120p. incl. tables, 92 refs.
(Contract AF 33(616)7475, Proj. 1710)
(MRL TDR 62-2) Unclassified report

DESCRIPTORS: (*Training, Effectiveness of *Aviation personnel for Space flight, Simulation.) *Selection, Stress (Psychology).

Considerations in the design of systems for measuring the proficiency of advanced flight vehicle crews in synthetic ground environments are presented. Emphasis is given to the logic of proficiency measurement and the general problems involved rather than to the analysis of specific details. A historical overview of aircrew proficiency measurement emphasizing early work and a list of study references on rating methods are appended. This report will be of interest to individuals directly concerned with simulator training programs, proficiency evaluation and standardization, training standards, and training equipment procurement for advanced flight systems. (Author)

24. PHOTOGRAPHY AND OTHER REPRODUCTION PROCESSES

AD-273 263 Div. 24
(TISTA/VGW) OTS price $1.60

Tactical Air Command, Langley Air Force Base, Va.
N-9 CAMERA GAM-83 CODING LIGHT ADAPTER.
Operational test and evaluation rept.
Feb 62, 13p. incl. illus. (Rept. no. TAC-TR-61-22)
Unclassified report

DESCRIPTORS: (Signal lights for *Photographic recording systems, Gun sight cameras, Effectiveness as Training devices in Jet fighters, Launching, Air to surface, Guided missiles.) (Flight testing of Design.)

The N-9 camera GAM-83 coding light adapter can contribute to the operational potential of the GAM-83 program. Through film assessing, a fighter pilot can always increase his combat potential. With the addition of the coding light, successful film assessing is now available to the GAM-83 pilot. By superimposing light signals on the gun camera film as the commands are given, the pilot can, through film assessing, compare the missile flight path against what commands were given. With this capability, each pilot can detect mistakes that can improve guidance techniques and missile effectiveness. (Author)

AD-273 345 Div. 24, 18
(TISTA/VGW) OTS price $4.60

Aerospace Corp., El Segundo, Calif.
THE IMAGE APPEARANCE OF PHOTOGRAPHIC TARGETS,
by J. Pierson. Jan 62, 15p. incl. illus. 16 refs.
(Rept. no. TDR-930(2520-20)TN-1)
(Contract AF 04(647)930)
(DCAS TDR 62-11) Unclassified report

DESCRIPTORS: (Mathematical analysis of Effectiveness of High altitude, *Photographic recording systems for *Aerial reconnaissance of Surface targets.) (Differential equations, Photographic analysis for Mathematical prediction of Optical images.)

Aperture theory and noise theory are used to predict the photographic appearance of quasipoint targets as a function of the system parameters and operational conditions of a high altitude aerial photography system. Point targets can be simulated by non-specular reflecting disks or by specular reflecting spheres. The images can be measured photometrically or subjectively. The techniques appear to offer a definitive and practical method of specifying and testing the resolution of complex photographic systems. (Author)

25. PHYSICS

AD-273 002 Div. 25, 30, 12
(TISTP/MFA) OTS price $1.60

Space Technology Labs., Inc., Los Angeles, Calif.
A SURVEY OF OPTICAL ANGULAR TRANSFER DEVICES FOR LABORATORY AND MISSILE APPLICATIONS,
by Martin F. Popelka, Jr. Dec 61, 18p. incl. tables (Rept. no. 6120-6016-NU-000)
Unclassified report

DESCRIPTORS: (Optics, *Optical equipment, Theodolites, Collimators and Reflectors for Guided missiles and Laboratories.) (*Inertial guidance, *Instrumentation, Design and Tests.)

A survey of optical angle transfer devices for laboratory and missile applications is presented. The instruments catalogued and described are used in many laboratory applications where it is necessary to determine angular deviations to a high degree of accuracy such as angle gage block calibration, parallelism of optical flats or wedge surfaces and surface table flatness. Applications are also encountered in the inertial component testing where optical alignment procedures are necessary in the evaluation of precision gyros and accelerometers. In addition, optical alignment equipment listed is required for aligning and automatically monitoring the inertial guidance system of a missile prior to launch. Proper selection and use of these instruments makes it possible to align the guidance system employed in missile and space vehicle development to within seconds of arc with respect to a geographical reference and automatically maintain this precise alignment over long periods of time. (Author)

AD-273 025 Div. 25
(TISTP/TL) OTS price $2.60

Microwave Research Inst., Polytechnic Inst. of Brooklyn, N. Y.
ABSTRACT OPERATOR METHODS IN ELECTROMAGNETIC DIFFRACTION,
by N. Marcuvitz. 22 Aug 61, 19p. (Research rept. no. PIBMRI-939-61)
(Contract AF 18(600)1505)
(AFOSR-1838) Unclassified report

DESCRIPTORS: (*Electromagnetic theory, *Quantum mechanics.) (*Electromagnetic waves, *Diffraction, *Operators (Mathematics), *Transformations (Mathematics), Vector analysis, Matrix algebra, Algebra, Green's function, Perturbation theory.)

The essence of a diffraction problem lies in the determination of a far scattered field from a prescribed incident field. In abstract terms, this relation is provided by a transformation operator, the explicit evaluation of which is the central problem of the abstract operator theory. Solution of this problem requires the inversion of an operator characterizing both the scattering region and the scatterer. For general classes of scattering problems it is possible to exhibit certain abstract features of the relevant operators and to derive abstractly therefrom the information corresponding to these features. Examples of such abstract procedures are discussed. (Author)

AD-273 032 Div. 25
(TISTP/JW) OTS price $9.10

Vitro Labs., West Orange, N. J.
A FLUID-TRANSPIRATION-ARC RADIATION SOURCE FOR SOLAR SIMULATION.

Final rept., Apr 60-Mar 61,
by R. M. Chappel, W. A. Jaatinen, and J. R. Baer. 13 Dec 61, 1v. incl. illus. table, refs.
(Rept. no. VL-2204-4-0)
(Contract AF 19(604)7241)
(AFCRL-1094) Unclassified report

DESCRIPTORS: (*Solar spectrum, Simulation, Plasma physics, *Electric arcs.) (Electric arcs, Gases, Argon.) *Blackbody radiation.

Work is described on a design and development program on the use of a plasma generator with a gas-transpiration anode for solar simulation. Over-all requirements are analyzed, and available sources are discussed. The development phase resulted in use of an opposing anode-cathode configuration for stable arc discharge. Spectroscopic studies of argon gas discharge showed significant increase of continuum-to-line intensity with pressure. Comparison with normal line spectra indicated that the continuum could be roughly predicted. This suggested the possibility of gas compositing for tailoring of spectral distribution of high pressure discharge lamps. However, more development work on anode materials is required before long-term operation would be possible. (Author)

AD-273 054 Div. 25
(TISTP/TL) OTS price $8.60

Microwave Research Inst., Polytechnic Inst. of Brooklyn, N. Y.
MODAL ANALYSIS AND SYNTHESIS OF ELECTROMAGNETIC FIELDS,
by L. B. Felsen and N. Marcuvitz. 27 July 61, 66p. incl. illus. 31 refs. (Rept. no. PIBMRI-841-60)
(Contract AF 19(604)7499)
(AFCRL-744) Unclassified report

DESCRIPTORS: (*Electromagnetic fields, *Propagation, Analysis, *Synthesis, Waveguides.) (*Spheres, *Cylindrical bodies, *Green's function, Vector analysis.) (*Physics, Partial differential equations.) (Complex variables, Functions, Transformations (Mathematics), Bessel functions, Integral equations.)

Contents:
Fundamental properties of the electromagnetic field
Modal representation of the Dyadic Green's functions in longitudinally stratified regions
Radiation problems in plane stratified regions
Alternative Green's function representations
Elementary sources configurations in free space
Sources in the presence of a semi-infinite dielectric medium

AD-273 059 Div. 25
(TISTP/MFA) OTS price $3.60

Ordnance Tank-Automotive Command, Detroit, Mich.
X-RAY DISTRIBUTION FROM SOURCES OPERATING AT FIVE TO FIFTEEN MILLION ELECTRON VOLTS,
by Peter Hoffmann-Pinther. 15 Sep 61, 33p. incl. illus. 9 refs. (Rept. no. RR-45)
(Proj. 599-01-004)
Unclassified report

DESCRIPTORS: (X rays, *Radiographic analysis, *Bremsstrahlung, *X-ray spectrum, Electrostatics.) (Electrons, Scattering and Photons, Absorption, Energy.) (Voltage, Betatrons, Cyclotron targets.) (Computers, Coding.)

The forward spectrum for a thick target was calculated for electrons with incident energy of 10, 15, 20, and 30 moc sq. (1 m sub o c squared = 0.511 mev). The angular distribution was computed for incident electron energies of 20 and 30 moc sq. To supplement these computations, the thin target bremsstrahlung was computed for several incident electron energies and apertures of the beam. A hardness factor was also computed for the thin targets. The equations for the thick target forward spectrum and the thin target spectrum were coded for the Burroughs 204 Digital computer. (Author)

AD-273 066 Div. 25
(TISTP/JW) OTS price $8.60

Advanced Electronics Center, General Electric Co., Ithaca, N. Y.
INVESTIGATION OF MICROWAVE ARTIFICIAL DIELECTRICS WITH CONTROLLABLE INDEX OF REFRACTION.
Final rept.
Jan 62, 1v. incl. illus. 13 refs. (Rept. no. R62ELC6)
(Contract AF 19(604)8488, Proj. 4600)
(AFCRL 62-57) Unclassified report

DESCRIPTORS: (Waveguides, *Semiconductors, Photoelectric shutters, *Dielectric properties.) (Antennas, Metallic crystals, Diodes.) (Microwaves, *Capacitance bridges.)

The feasibility of photo-controlling an artificial dielectric consisting of semiconductor obstacles is considered. Investigations were performed in three major areas: developing an artificial dielectric made up from capacitance by large lossless obstacles, development and evaluation of photosensitive semiconductor obstacles, and the determination of the antenna type or types compatible with the optically controllable artificial dielectric. The susceptance of large rectangular metallic discontinuities is derived. Obstacles of this type were constructed and their measured susceptance compared favorably with the theoretical value over a wide range of frequencies. An artificial dielectric can be constructed with these obstacles and the range of refractive index obtainable. The properties of bulk photosensitive semiconductors are analyzed in terms of their effect on microwave fields and the physics of the material. Experimental measurements of the microwave characteristics of an obstacle using a photobiased semiconductor capacitive junction is presented. This latter method is a very effective means of controlling the obstacle susceptance. The controllable obstacles did not possess spherical symmetry and, as a result, an artificial dielectric consisting of a lattice of these obstacles will have anisotropic properties. (Author)

AD-273 067 Div. 25, 20, 8
(TISTP/JW) OTS price $13.50

General Motors Research Labs., Warren, Mich.
INVESTIGATIONS ON THE DIRECT CONVERSION OF NUCLEAR FISSION ENERGY TO ELECTRICAL ENERGY IN A PLASMA DIODE.
Annual rept., 1 Jan 61-31 Jan 62,
ed. by Frank E. Jamerson. 31 Jan 62, 1v. incl. illus. tables, refs.
(Contract Nonr-310900)
Unclassified report

DESCRIPTORS: (*Nuclear energy, Fission, Fission products, *Plasma physics, Thermionic emission.) (Diodes, Rare gases, Electrons, *Electric power production.) (Cathodes, Cesium, *Cesium electron tubes.)

Results of experimental and theoretical investigations are presented on the use of a nuclear generated plasma in a noble gas plasma diode thermionic converter. Related programs of emitter materials development and plasma measurements are described. These are presented in the following individual reports: Noble Gas Plasma Diode Inpile Experiment IV; Noble Gas Plasma Diode Inpile Experiment V; A Plasma Sheath Theory with Voltage-Independent Ion Source; The Development of Emitter Materials for Use in the Noble Gas Plasma Diode; Thermionic Emission of UC-Nb and UC-Re; and Spectroscopic Measurements of Plasma Temperatures and Densities in a High Pressure Cesium Diode. (Author)

AD-273 069 Div. 25
(TISTP/TL) OTS price $6.60

Instituto Nacional de Tecnica Aeronautica (Spain).
ON THE INTERNAL STRUCTURE OF LAMINAR DIFFUSION FLAMES,
by Amable Linan. 10 Nov 61, 55p. illus. 21 refs.
(Technical note no. 3)
(Contract AF 61(052)221)
(AFOSR-2111) Unclassified report

DESCRIPTORS: (*Laminar boundary layer, *Flames, *Diffusion, Specific heat, Conductivity, Chemical reactions, Kinetic theory, Fuels, Oxidizers.) (Differential equations, Integral equations, Green's function, Polynomials.) Structures of flames.

A study was carried out on the influence of chemical kinetics on laminar diffusion flames. In most of the flames of practical interest, the reaction zone is of negligible thickness, making it possible to obtain a solution of the boundary layer type. At each side of the reaction zone the temperature and concentration distributions may be determined by using the Burke-Schumann assumption of infinitely fast reaction rate. In the reaction zone, or chemical boundary layer, the convection effects may be neglected as compared with chemical reaction, conduction and diffusion effects. The equations governing this layer take then a simple form; and from their solution a criterium for the validity of Burke-Schumann assumption and for flame extinction may be obtained. (Author)

AD-273 070 Div. 25
(TISTP/TL) OTS price $3.60

Israel Inst. of Tech., Haifa.
BUCKLING OF THIN CIRCULAR CONICAL SHELLS SUBJECTED TO AXISYMMETRICAL TEMPERATURE DISTRIBUTIONS AND EXTERNAL PRESSURE,
by Josef Singer. July 61, 18p. illus. (Technical note no. 3)
(Contract AF 61(052)339)
(AFOSR-859) Unclassified report

DESCRIPTORS: (*Conical bodies, *Buckling, Temperature, Pressure, *Thermal stresses.) (*Taylor's series, Differential equations, Polynomials, Integral equations, Matrix algebra.)

A method for the analysis of the instability of conical shells under external pressure is applied to the problem of buckling due to axisymmetrical temperature distributions. The method is based on a solution of the Donnell type stability equations, derived by Seide, and rederived in a modified form to facilitate solution by the Galerkin method. The solution implies slightly relaxed boundary conditions for the u and v displacements, but for the w displacements the usual conditions of simple supports are enforced rigorously. The procedure for the calculation of a critical temperature parameter is described in detail and the method is then extended to the case of a shell subjected simultaneously to external pressure and axisymmetrical temperature distributions. The thermal stresses needed for the stability analysis are computed with the aid of a solution of Meissner equations, in the presence of axisymmetrical temperature distributions, developed by Huth. Typical cases are analysed. (Author)

AD-273 072 Div. 25, 9
(TISTP/TL) OTS price $14.00

Lincoln Lab., Mass. Inst. of Tech., Lexington.
REENTRY PHYSICS AND PROJECT PRESS PROGRAMS.
Semiannual technical summary rept. no. 6,
1 July-31 Dec 61.
9 Feb 62, 1v. incl. illus. tables, refs.
(Contract AF 19(604)7400)
Unclassified report

DESCRIPTORS: (Atmosphere entry, Re-entry vehicles, *Plasma physics, *Re-entry aerodynamics, *Magnetohydrodynamics.) (*Electromagnetic fields, *Gas ionization, Electrons, Density, Measurement in Turbulent flow, Wake, Shock waves, Ablation.) (Wave transmission, Reflection, S band, Ultra high frequency, Radar tracking, Radar signals.) (Telemeter systems, Data processing systems, Programming, Digital computers.) (Instrumentation, Photography, Schlieren photography.) Optical tracking.

Contents:
Flow field studies
Electronic properties of re-entry plasmas
Electromagnetic interactions with re-entry plasmas
Experimental program at Wallops Island
The Press program

AD-273 089 Div. 25
(TISTP/MFA) OTS price $2.60

Aeronautical Electronic and Electrical Lab., Naval Air Development Center, Johnsville, Pa.
HEAT FLOW IN RECTANGULAR PLATE OF UNIFORM THICKNESS UNDER VARYING AMBIENT TEMPERATURE.
Phase rept.
2 Feb 62, 17p. incl. illus. (Rept. NADC-EL-6199)
(Weptask no. RAV41J002/2021/R008-03-001)
Unclassified report

DESCRIPTORS: (*Heat transfer and *Thermal conductivity in Fins and Metal plates.) (Cooling, Temperature, Measurement.) (Differential equations, Integral transforms, Partial differential equations.)

An exact solution is found for the temperature distribution in a rectangular plate of uniform thickness under varying ambient temperature. For the special case of temperature variation in the form of a sinusoidal pulse, a numerical comparison is made of the exact solution and an approximate solution obtained by a modification of

the solution for constant ambient temperature. The range of validity of this approximate solution is considered in terms of a rise time. (Author)

AD-273 102 Div. 25, 9
(TISTM/EJH) OTS price $2.60

Cornell Aeronautical Lab., Inc., Buffalo, N. Y.
MEASURED TRANSITION PROBABILITY FOR THE FIRST-POSITIVE BAND SYSTEM OF NITROGEN,
by Walter H. Wurster. Jan 62, 15p. illus. 17 refs. (Rept. no. QM-1626-A-3)
(Contract DA 30-069-ORD-3443)
Unclassified report

DESCRIPTORS: (*Aerodynamic heating, Shock waves, Gases, *Nitrogen, Infrared spectroscopy, *Electron transitions, Theory, Quantum mechanics.) (High temperature research, Air, Spectrographic analysis, Reentry aerodynamics.)

The electronic transition probability for the N first-positive system was obtained from absolute spectral-intensity measurements of the IR radiation from shock-heated N. The temperature dependence of the spectrum agreed with that determined for N in thermodynamic equilibrium. An electronic transition moment equal to 0.096 atomic units and independent of internuclear separation gave the best fit to the data. The measured intensities were lower by a factor of 5 than those reported for measurements in shock-heated air. A second component of radiation was detected, attributable to either the CN red or N2+ Meinel band systems. Further experiments indicated that this radiation was not due to the Meinel bands. (Author)

AD-273 118 Div. 25
(TISTP/TL) OTS price $2.60

Allied Research Associates, Inc., Boston, Mass.
HEAT-BALANCE-INTEGRAL METHOD FOR PULSELIKE HEAT INPUTS,
by Theodore R. Goodman and Nazakat Ullah. Feb 62, 33p. incl. illus. 4 refs.
(Contract AF 49(638)839, Proj. 9782)
(AFOSR-2261) Unclassified report

DESCRIPTORS: (*Heat transfer, *Solids, Sheets, *Thermal conductivity.) (*Integral equations, Differential equations, Numerical analysis.)

The method of the heat-balance intregal is extended to handle heat conduction problems with arbitrary pulse type heat inputs. A general solution is given using quadratic and cubic temperature profiles. The results for triangular and parabolic heat pulses are shown graphically and compared with the exact ones. The temperature-dependent heat flux problem is also briefly discussed. (Author)

AD-273 145 Div. 25, 30
(TISTP/TL) OTS price $4.60

Research Lab. of Electronics, Mass. Inst. of Tech., Cambridge.
HIGH SPEED COMPUTER SYSTEM RESEARCH.
Final rept.
24 Jan 62, 47p. incl. tables, refs.
(Contract NObsr-77603)
Unclassified report

DESCRIPTORS: (*Solid state physics, Electron beams, *Thin films, *Magneto-optic rotation, Cobalt, Dielectrics, Ferromagnetic materials, Magnetic effects, Perturbation theory.) (Molecular structure, Feedback.) (Lattices, Crystal structure, Intermetallic compounds, Tin compounds, Copper compounds, Iron compounds, Algebra.) (Computers, *Digital computers.) Computer systems theory.

Contents:
Electron decomposition plating
Component research
  Field emission switch
  Ultrahigh vacuum system
  Electron-Beam activated reactions
Computer system theory
  Crystal algebra
  Electrophoresis
Publications of this group
  Journal papers
  Meeting papers
  Theses

AD-273 149 Div. 25
(TISTP/TL) OTS price $2.60

Microwave Research Inst., Polytechnic Inst. of Brooklyn, N. Y.
SCATTERING AND GUIDED WAVES AT AN INTERFACE BETWEEN AIR AND A COMPRESSIBLE PLASMA,
by A. Hessel, N. Marcuvitz and J. Shmoys.
29 Sep 61, 21p. incl. illus. 2 refs. (Research rept. no. PIBMRI-953-61)
(Contract AF 19(604)4143)
(AFCRL 62-29) Unclassified report

DESCRIPTORS: (*Electromagnetic waves, *Scattering, *Plasma physics, Compression shock, Acoustics, Optics, Wave transmission, Air.) (Gas ionization, Magnetic fields, Reflection, Surface properties, *Propagation.) (Differential equations, Transformations (Mathematics), Partial differential equations.)

The problem considered is that of radiation by a uniform magnetic current line source parallel to a rigid plane interface between free space and a compressible plasma. The line source is located in the free space region. The plasma is assumed to be a compressible electron gas with no drift and no dc magnetic field. Small signal theory is used. Reflection and transmission coefficients for a plane electromagnetic wave incident on the interface from the free space side are calculated. The interface is found to support a surface wave, whose properties are examined. This surface wave, unlike the corresponding one for incompressible plasma, does not have a high frequency cut-off. Expressions for all (electromagnetic and acoustic) field components excited by the line source are obtained. (Author)

AD-273 155 Div. 25
(TISTP/MFA) OTS price $1.60

Rand Corp., Santa Monica, Calif.
COLLISION DAMPING OF PLASMA OSCILLATIONS,
by D. F. DuBois, V. Gilinsky and M. G. Kivelson.
Mar 62, 7p. incl. illus. 5 refs. (Rept. no. RM 3050 PR)
(Contract AF 49(638)700)
Unclassified report

DESCRIPTORS: (Transport properties and *Damping of *Plasma oscillations, *Electromagnetic waves, Absorption, Excitation.) (Fourier analysis, Integral transforms, Perturbation theory, Probability.)

Calculations were made of the absorption of longitudinal electromagnetic waves in a plasma (plasma oscillations). The results show that collision damping, which we calculate here, dominates the collisionless Landau damping for long wavelengths in high temperature, low density plasmas. (Author)

AD-273 181 Div. 25
(TISTP/MFA) OTS price $1.60

Centre de Physique, Electronique et Corpusculaire (France).
GENERATION OF INFRAMILLIMETRIC WAVES BY MEANS OF ELECTRONIC BEAMS.
Dec 61, 6p. illus. (Rept. no. WR 815; Status rept. no. 2)
(Contract AF 61(052)519)
(RADC TDR 62-113) Unclassified report

DESCRIPTORS: (*Infrared radiation, *Electron beams from Electron guns, Tests.) (Feasibility studies, *Backward-wave oscillators, Waveform generators, Design.) Photographic analysis.

The study concerns the possibilities of the O-type Carcinotron as a submillimeter wave generator and the construction of experimental carcinotrons with the following design objectives: center frequency of 350 Kmc/s; output power of 10 milliwatts CW; bandwidth of 10%; and maximum voltage of 10,000 volts. Power and frequency limits should be pushed by using higher current densities. As an intermediate step, the study will include the design of very high beam density guns in the 1000 A/sq cm range.

AD-273 218 Div. 25, 14
(TISTM/EJH) OTS price $4.60

Arizona State U., Tempe.
RESEARCH TO PRODUCE A TEMPERATURE STABLE MATERIAL WITH A HIGH THERMOELECTRIC FIGURE OF MERIT.
Final rept. for 18 Sep 59-17 Nov 61 on Thermoelectric Materials and Device Research, by B. Gossick, J. Morrison and others.
15 Jan 62, 39p. incl. illus. refs. (Rept. no. 8)
(Contract DA 36-039-sc-85249)
Unclassified report

DESCRIPTORS: (*Semiconducting films, *Semiconductors, Materials, Ceramic materials, *Titanium compounds, Dioxides, Colloids, Impurities, Conductivity, *Thermoelectricity, High temperature research, Stability, Crystals, Single crystals.) *Crystal rectifiers.

The possibility that a semiconducting solid sol might be prepared which would have favorable thermoelectric properties exists. However, the results of this program appear to indicate that metallic particles in rutile do not provide a suitable thermoelectric material. Rectifiers made with semiconducting rutile are of sufficient interest in themselves to justify extending this study. The study of contacts on semiconducting rutile established that rectifiers can be made which perform favorably compared with early Si rectifiers. Although rectifying barriers on TiO2 are not new, the method used for preparing these barriers is unique, and the reverse voltage breakdown is higher. Transient measurements revealed that hole injection plays a minor role in rectification with these contacts. However, more detailed measurements of the current-voltage characteristics are required in order to learn whether electrons pass over the barrier by the simple diode theory or whether the diffusion process must be taken into account. The extent to which the avalanche, tunnel and Schottky processes enter into the breakdown voltage have not been determined. (Author)

AD-273 228 Div. 25, 15
(TISTP/TL) OTS price $12.00

Allison Div., General Motors Corp., Indianapolis, Ind.
INVESTIGATION OF THE MONOCAPILLARY THERMIONIC EMITTER AS A DUAL SOURCE OF IONS AND ELECTRONS.
Quarterly technical progress rept. no. 1, by D. L. Dresser and W. Laurita. 15 Feb 62, 156p. incl. illus. tables, 16 refs. (Rept. no. EDR 2617)
(Contract AF 33(616)8299, Proj. 3145)
Unclassified report

DESCRIPTORS: (*Kinetic theory of Gases, *Cesium, Gas flow through Capillary tubes for *Thermionic emission of *Ions, *Electrons, Plasma physics.) (Tungsten, Molybdenum, Tantalum.) (Integral equations, Differential equations, Matrix algebra, Numerical analysis, Green's function.) Instrumentation.

The capillary emitter is a new approach to thermionic energy conversion. In this concept, cesium flows through a refractory emitter structure so that the emitter becomes a dual source of ions and electrons. To determine the fundamental performance characteristics of the capillary emitter, a theoretical and experimental study was conducted on a monocapillary configuration. Theoretical work was directed towards the solution of the exact equation describing the flow of cesium through a capillary; several approaches to the solution of the integro-differential flow equation are discussed. Since none of these solutions were successful, a linear pressure drop model is used to predict capillary performance. The experimental device was a monocapillary emitter and collector structure to measure ion and electron emissions as a function of emitter temperature, cesium temperature, and spacing. The fabrication and assembly of the test devices is described in detail.

AD-273 236 Div. 25
(TISTP/WH) OTS price $3.60

Little, Arthur D., Inc., Cambridge, Mass.
ON THE IMPACT OF PELLETS WITH THIN PLATES THEORETICAL CONSIDERATIONS. PART 1,
by G. V. Bull. Jan 62, 33p. incl. illus. 11 refs. (Rept. no. 63270-03-01)
(Contract NAS 5-664)
Unclassified report

DESCRIPTORS: (*Meteorites, Satellite vehicles.) (*Pellets, *Hypervelocity projectiles, *Impact shock, Dynamics, Particles.)

The impact of pellets with thin plates at very high velocities was investigated. To render the problem tractable to analysis, a model has been assumed which allows use of essentially one-dimensional theory to predict both the impact shock-induced conditions and the subsequent

expansion flow, although the latter state has been treated subsequently as a general axisymmetric three dimensional flow. The problem is considered in three phases. The first phase is the shock-induced impact states. Based on the concept of the strong shock wave, it is seen that the initial impact-induced states may be expressed readily in terms of impact velocities, initial density ratios, and the polytropic gas exponent in the shocked states. The second phase results from the high temperatures generated on impact. The resultant radiative loss mechanisms result in considerable reduction in the thermodynamic states from which expansion occurs. The third phase, the break up of the pellet into an expanding particle cloud, was approached from the restricted point of view of one-dimensional shock and rarefaction waves interacting with a cylindrical rarefaction. This non-stationary wave system tends to accelerate the outer-material, essentially redistributing the initial kinetic energy of the pellet. (Author)

AD-273 247 Div. 25
(TISTP/TL) OTS price $1.60

Mathematics Research Center, U. of Wisconsin, Madison.
THE NON-ISENTROPIC PERTURBATION OF A CENTERED MAGNETOHYDRODYNAMIC SIMPLE WAVE,
by Roy M. Gundersen. Nov 61, 11p. 3 refs.
(MRC technical summary rept. no. 280)
(Contract DA 11-022-ORD-2059)
Unclassified report

DESCRIPTORS: (*Shock waves, Fluid flow, *Magnetohydrodynamics, Particles, Magnetic fields.) (Compressible flow, Gas ionization, *Fluid mechanics, Acoustics.) (*Perturbation theory, Partial differential equations.)

Since the equations governing the motion of a perfectly conducting compressible fluid belong to the class of reducible hyperbolic equations, it is possible to build up a theory of simple waves rather parallel to that of ordinary gas dynamics. For a monatomic gas, analogs of the Riemann invariants can be determined explicitly. Because of the existence of a relation between the induction and the local speed of sound, valid for uniform of simple wave flows, it is possible to reduce the number of governing equations so that previous results may be extended to determine the non-isentropic perturbation of a centered magnetohydrodynamic simple wave. (Author)

AD-273 248 Div. 25
(TISTM/EJH) OTS price $2.00

Minnesota U., Minneapolis.
STUDY OF NOISE PROPERTIES OF GAS DISCHARGE LAMPS, VOLUME II.
Rept. for 15 Feb 59-14 Feb 61,
by Aldert van der Ziel. Oct 61, 64p., incl. illus. 9 refs.
(Contract AF 33(616)5479, Proj. 4150)
(ASD TR 61-179, vol. 2)
Unclassified report

DESCRIPTORS: (*Gas discharges, *Noise, Theory.) (*Plasma physics, Gas ionization, Electromagnetic waves, Low frequency, High frequency, Temperature.) (Test methods, Test equipment, Discharge tubes.)

Contents:
Equipment used for noise and impedance measurements
Early measurements
Measurements on a multiple probe tube
Measurements on probes of different geometry
Equivalent noise temperature determinations
Equivalent noise temperature at high frequencies
High frequency noise mechanism
Theory of ion current noise
Theory of enhanced electron current noise
Space-charge suppression
Theory of high-frequency noise
Electron temperature determination with single probes

AD-273 249 Div. 25
(TISTP/TL) OTS price $1.75

Minnesota U., Minneapolis.
THE DECAY OF ELECTROMAGNETIC RADIATION IN GASEOUS DISCHARGES.
Rept. on Study of Noise Properties of Gas Discharges,
by Alan D. Kaske and Hendrik J. Oskam. Oct 61, 47p. incl. illus. tables, refs.
(Contract AF 33(616)5479, Proj. 4150)
(ASD TR 61-605) Unclassified report

DESCRIPTORS: (*Gas discharges, Noise, Theory.) (*Electromagnetic waves, Measurement, *Plasma physics, Bremsstrahlung, High frequency, Neon, Wave transmission.) (*Gas ionization, Electrons, Energy, Ions, *Discharge tubes.)

One of the important parameters determining the properties of gaseous plasmas is the value of the average electron energy. For instance, the phenomena occurring in disintegrating plasmas depend strongly on this energy and thus on the transient behavior of the average electron energy. Calculations relating to the characteristic time constant of the electron energy for electron-neutral and electron-ion interactions are presented. A method is described for measuring this time constant and preliminary results are given. (Author)

AD-273 250 Div. 25, 17, 30
(TISTM/BRW) OTS price $5.60

Martin Co., Baltimore, Md.
EFFECT OF VACUUM ENVIRONMENT ON THE MECHANICAL BEHAVIOR OF MATERIALS.
Final rept., 1 Oct 60-1 Oct 61,
by I. R. Kramer and S. E. Podlaseck. Oct 61, 46p. incl. illus. (Rept. no. RM-102)
(Contract AF 49(638)946, Proj. 9782)
(AFOSR-2139) Unclassified report

DESCRIPTORS: (Low pressure research, *Metals, Fatigue (Mechanics), Creep, *Mechanical properties, Tensile properties, Space environmental conditions.) (Laboratory equipment, Vacuum apparatus, Design.) (Spaceships, Satellite vehicles, Materials, Single crystals, Metallic crystals, Heat resistant alloys, Refractory materials, Alloys, Aluminum.)

Apparatus for conducting fatigue, tensile and creep studies in the pressure range 760 mm to 10 to the - 8th power mm Hg is described. Experimental data are presented for Al single crystals showing, with decreasing pressure, an improvement in fatigue life and a decrease of strength in tension and creep. (Author)

Division 25 - PHYSICS

AD-273 267 Div. 25, 8, 15
(TISTP/MFA) OTS price $2.60

Republic Aviation Corp., Farmingdale, N. Y.
AMPLIFICATION OF SIGNALS IN AN ELECTRON BEAM THROUGH A PLASMA,
by Philip Parzen and G. Nomicos. 15 Feb 62, 18p.
(Technical note no. 36)
(Contract AF 33(657)7988)
Unclassified report

DESCRIPTORS: (*Electron beams, Modulation, *Plasma physics, Magnetic fields.) (Velocity and Motion, Equations.) (Partial differential equations, Bessel functions, Perturbation theory.)

The amplification factor of the modulation of an electron beam of finite radius passing through an infinite plasma is computed. Two cases are considered; (1) the case of an electron beam confined to move longitudinally by an infinite longitudinal field, and (2) that of an electron beam which is free to move transversely under the action of time varying fields. In the first cae the amplification is due to bunching which takes place in the interior of the electron beam while in the second case the amplification is due to the scalloping boundary of the electron beam. In both cases the magnitude of the amplification is about the same as that occurring in a infinite electron beam passing through a infinite plasma. (Author)

AD-273 291 Div. 25
(TISTP/MFA) OTS price $2.60

Brown U., Providence, R. I.
THE SCATTERING CROSS SECTION OF A COMPOSITE CYLINDER. I. GEOMETRIC OPTICS.
Rept. on Research Directed Toward the Study of Radiation of Electromagnetic Waves,
by Ralph D. Kodis. Dec 61, 17p. illus. 6 refs.
(Scientific rept. no. AF 4561/15)
(Contract AF 19(604)4561, Proj. 5635)
(AFCRL 62-50) Unclassified report

DESCRIPTORS: (*Optics, *Geometry, Scattering, Light, Diffraction, Reflection, Wave transmission in *Dielectrics, Cylindrical bodies.) (Taylor's series, Wave analysis, Functions.)

The optical analogue of the scattering cross section of a composite cylinder is developed from a representation of the forward scattered amplitude as a continuous spectrum of radial eigenfunctions. The Debye approximation for the Hankel functions, which is valid when their arguments are large compared to the order, leads to a series of integrals which can be evaluated asymptotically by the method of stationary phase. The final result is a double sum of terms, each of which can be interpreted as an optical ray. (Author)

AD-273 308 Div. 25
(TISTP/MFA) OTS price $3.60

Aerophysics Lab., Mass. Inst. of Tech., Cambridge.
THERMODYNAMIC COUPLING IN BOUNDARY LAYERS,
by Judson R. Baron. Oct 61, 29p. incl. illus. 16 refs. (Technical rept. no. 28)
(Contract AF 49(638)245, Proj. 17500)
(AFOSR-1893) Unclassified report

Presented at the American Rocket Society Space Flight Report to the Nation, New York, N. Y., 9-13 Oct 61.

DESCRIPTORS: (*Thermodynamics, Thermal diffusion and Heat transfer in Boundary layers, *Laminar boundary layers.) (Transport properties, Relaxation time, Helium, Air, Gas flow, Coolants, Cooling.)

Experimental results gathered in recent years for binary mixture mass transfer models are shown to yield consistent evidence of discrepancies with analytic considerations. Specifically, measured recovery temperatures are appreciably higher than those predicted, while heat transfer coefficients are satisfactorily reproduced. It is shown on the basis of both approximate and exact solutions for plates and stagnation points that the discrepancies are related to thermal diffusion effects, a major influence being apparent in application of the surface boundary condition for an adiabatic wall. As a result, some reexamination is necessary of past criteria for mass addition effects as they pertain to specific injected media. A prime example is the equivalence of helium and air as coolants despite the heretofore suggested preference for low density injectants on a perfect gas basis. (Author)

AD-273 323 Div. 25
(TISTP/TL) OTS price $6.60

Ohio State U. Research Foundation, Columbus.
A STUDY OF THE TOTAL ABSORPTION NEAR 4.5 MICRONS BY TWQ SAMPLES OF N2O, AS THEIR TOTAL PRESSURES AND N2O CONCENTRATIONS WERE INDEPENDENTLY VARIED. Master's thesis,
by Larry Lincoln Abels. Jan 62, 57p. incl. illus. tables, 9 refs. (Scientific rept. no. 3)
(Contract AF 19(604)6141)
(AFCRL 62-236) Unclassified report

DESCRIPTORS: (*Infrared radiation, *Absorption by Vibration, Rotation, Gases Cells of Nitrogen, Oxides, Isotopes.)

Spectra of the 4.5 microns N2O band were obtained after the radiation passed through two cells containing mixtures of N2O and N2. With the total pressure and absorber concentration of one cell adjusted so that the absorption by it alone lay essentially in the square root region where the absorption is approximately proportional to the square root of the total pressure and absorber concentration, the spectra were obtained as the total pressure and N2O concentration in the second cell were varied over a wide range. (Author)

AD-273 342 Div. 25, 12, 15
(TISTP/MFA) OTS price $1.10

AVCO Research Lab., Everett, Mass.
A NOTE ON THE SURFACE INTEGRAL OF LAMINAR HEAT FLUX TO SYMMETRIC BODIES AT ZERO INCIDENCE,
by Nelson H. Kemp. Sep 61, 5p. 4 refs.
(Research rept. no. 116)
(Contract AF 04(647)278)
(AFBSD TN 61-26) Unclassified report

DESCRIPTORS: (*Heat transfer in Laminar boundary layer, *Guided missiles, Axially symmetric flow.) (*Integral equations, Combinatorial analysis, Linear systems.)

In the study of heating problems of missiles, it is frequently necessary to obtain the surface integral of the heat transfer. This is usually obtained by a numerical integration of the heat transfer rate distribution. For laminar heat transfer to symmetric bodies at zero angle of attack, this integration can be done analytically, if only a few reasonable approximations are made. The result is expressible entirely in terms of

quantities which also enter the heat transfer rate distribution expression, so performing the surface integral becomes a very simple matter of algebraic combination of known quantities. (Author)

AD-273 401 Div. 25
(TISTP/WH) OTS price $1.60

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson Air Force Base, Ohio.
HEAT EXCHANGE DURING FREE MOVEMENT AROUND A HORIZONTAL CYLINDER IN RAREFIED AIR,
by A. K. Rebrov. 26 Feb 62, 12p. incl. illus. (Trans. no. FTD-TT-62-135 of Inzhenerne-Fizicheskiy Zhurnal 9:32-39, 1961)
Unclassified report

DESCRIPTORS: (*Heat transfer in *Gas flow around Cylindrical bodies in Air.) USSR, Superaerodynamics.

AD-273 402 Div. 25, 22
(TISTP/WH) OTS price $3.60

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson Air Force Base, Ohio.
JOURNAL OF APPLIED MECHANICS AND THEORETICAL PHYSICS (SELECTED ARTICLES).
7 Mar 62, 37p. incl. illus. 6 refs. (Trans. no. FTD-TT-62-74 of Zhurnal Prikladnoy Mekhaniki i Tekhnicheskoy Fiziki 4:pp. 82-101, 1961)
Unclassified report

DESCRIPTORS: (*Seismic waves, Propagation, *Underground explosions, USSR, Wave transmission.) (Solids, *Demolition.)

Contents:
The movement of a free surface of homogeneous ground during an underground explosion, by N. I. Onis'ko and Ye. I. Shemyakin
Demolition of a solid by an explosion, by V. V. Adushkin and A. P. Sukhotin

AD-273 448 Div. 25
(TISTM/GEC) OTS price $7.60

Laboratory for Insulation Research, Mass. Inst. of Tech., Cambridge.
(No title).
Progress rept. no. 30.
Jan 62, 71p. incl. illus. tables, 71 refs.
(Contracts Nonr-184110 and AF 33(616)8353)
Unclassified report

DESCRIPTORS: (Ferroelectric crystals, *Dielectrics, *Crystals, *Single crystals, Lattices, Piezoelectric crystals, Preparation, Growth, Dielectric properties, Electrical properties, Magnetic properties, Ferroelectricity, Surface properties, High temperature research.) (X-ray diffraction analysis, Mass spectroscopy, Light, Amplifiers, Masers, Optical systems.) (Alkaline earth compounds, Alkali metal compounds, Garnets, Halides.)

Contents:
High dielectric constant materials
High temperature dielectrics
Breakdown, field emission, dielectric and elastic spectroscopy
Crystal physics
Magnetic spectroscopy
Optical modulation
Magnetics
Mathematical crystallography
Structure analysis

26. PRODUCTION AND MANAGEMENT

AD-273 034 Div. 26, 15
(TISTP/JW) OTS price $2.60

Electrical Engineering Research Lab., U. of Illinois, Urbana.
CRITICAL PATH ANALYSIS OF TIME-ORDERED CONSTRUCTION AND ASSEMBLY PROJECTS,
by B. R. Myers. 29 Dec 61, 23p. incl. illus. table, 4 refs. (Technical note no. 19)
(Contract AF 49(638)63, Proj. 475-1)
(AFOSR-2060) Unclassified report

DESCRIPTORS: (Statistical analysis, *Mathematical logic, Curve fitting, Construction, Scheduling.) (*Management engineering, *Operations research, Production, Programming.)

A method for analyzing time-sequential ordered construction and assembly projects with multi-duration jobs and arbitrary job scheduling is presented. The method employs partitioning techniques applied to an oriented linear graph representation of the project. The main principle involves the critical path, which is the longest continuous path from the starting vertex to the finishing vertex in the graph, and therefore represents the minimum time in which the project can possibly be completed. Bounds on project time and number of men required are given. (Author)

AD-273 052 Div. 26, 17
(TISTM/GEC) OTS price $1.25

Western Gear Corp., Lynwood, Calif.
HIGH ENERGY RATE FORGING DEVELOPMENT.
Interim technical rept. no. 3, 10 Dec 61-10 Feb 62,
by J. M. Palsulich and R. H. Hall. Feb 62, 46p. incl. illus. tables, 4 refs. (Rept. no. 622-206)
(Contract AF 33(600)42523)
(AMC TR 7-866, vol. 3)
Unclassified report

DESCRIPTORS: (*Forging, Alloys, *Heat resistant alloys, *Refractory materials, *Steel, Stainless steel, *Tool steel, *Titanium alloys.) (Temperature, Pressure, Deformation, Heat treatment.) (Microstructure, Tensile properties, Mechanical properties.) Industrial equipment.

Physical property tests on high-energy-rate forged upsets from PH15-7Mo steel indicate that it is possible to achieve excellent ductility in both longitudinal and transverse directions. The wide spread in data for the number of specimens examined dictated the need for further development before the optimum forging temperature and amount of deformation per blow to insure these properties can be firmly established. Materials studied were AISI 4340, Ti-6Al-4V, H-11 tool steel and PH15-7Mo. Forging parameters for scissors and bracket configurations were established. (Author)

AD-273 057 Div. 26, 17
(TISTM/BRW) OTS price $8.10

Allegheny Ludlum Steel Corp., Brackenridge, Pa.
MOLYBDENUM ALLOY EXTRUSION DEVELOPMENT PROGRAM.

Interim technical engineering rept. no. 4, 15 Aug-15 Dec 61.
Jan 62, 41p. incl. illus. tables, 7 refs.
(Contract AF 33(600)40861)
(ASD TR 7-785, vol. 4) Unclassified report

DESCRIPTORS: (*Extrusion, Forging, *Molybdenum alloys (TZM), Titanium alloys, Zirconium alloys.) (Surface properties, Microstructure, Hardness, Tensile properties.) (Metal forming presses, Heating, Dies, Coatings, Flame spraying, Zirconium compounds, Oxides, Lubrication.)

The extrudability of hot-work forged TZM (Mo alloy) was evaluated by the extrusion of solid rounds at a reduction ratio of 18:1 within the temperature range of 2300 to 2700 F. The extrusions were characterized by poor surface quality and by little change in hardness from that of the original billet. Extrusion data show that hot-work forged TZM was extruded from lower temperatures than hot-cold worked TZM. Regardless of billet temperature and die design, the extrusion of hot-work forged TZM required capacity liner pressure of 215,000 psi which is related to a total resistance-to-deformation of 75,000 psi. T-shape extrusion dies were coated with zirconia by plasma-arc spraying of 7 different source materials. Only one T-shape extrusion of hot-cold worked TZM at a reduction ratio of 16:1 from 3000 F indicated little variation in dimensions and good surface quality. T-shape extrusions of TZM generally exhibited an increase in hardness above that of the original billet except in mid-extrusion. (Author)

AD-273 063 Div. 26
(TISTE/CDM) OTS price $11.00

Frebank Co., Glendale, Calif.
DESIGN, DEVELOPMENT AND TESTING OF NON-MODULATING PRESSURE CONTROL VALVES. VOLUME I.
by Lynn K. Smith. Dec 61, 139p. incl. illus. tables.
(Contract AF 04(647)429; Continuation of Contract AF 04(647)158)
(AFBSD TR 61-71, vol. 1) Unclassified report

DESCRIPTORS: (*Gas valves, *Control valves, Hydraulic actuators, Springs, Design, Tests, Vibration, Temperature, Acceleration.) (Safety valves, *Pressure regulators, Design, Tests.) (Guided missiles, Satellite vehicles.)

Research was conducted on light-weight, simple, rugged, and vibration and temperature resistant gas control valves using the belleville spring snap-action concept. The belleville spring system, utilizing the negative rate of resistance of belleville springs, is used in conjunction with a pressure sensing diaphragm to create a mechanism to activate valves and pilot systems. The snap-action pressure switches operated satisfactorily under extreme vibration and temperature environments. Application of the concept to pressure control valves produced units that can operate satisfactorily over a temperature range of -450 to +300 F and a vibration range of 5 to 2000 c with accelerations of 65 g. A pressure relief valve was developed that is capable of maintaining zero leakage at pressures to 90% of cracking pressure, with the cracking pressure adjustable from 50 to 100 psig. An evaluation of operation with a cracking pressure of 350 psig proved that the deadband must be compromised if the initial diaphragm size is to be used. A pressure regulator was developed that was capable of satisfactory operation over the full range of temperature and vibration. (Author)

AD-273 064 Div. 26
(TISTE/CDM) OTS price $14.50

Frebank Co., Glendale, Calif.
DESIGN, DEVELOPMENT AND TESTING OF NON-MODULATING PRESSURE CONTROL VALVES. VOLUME II.
Dec 61, 1v. incl. illus. tables.
(Contract AF 04(647)429)
(AFBSD TR 61-71, vol. 2) Unclassified report

Included in this document is Rept. no. 160; AFBMD TN 60-18, AD-239 181.

DESCRIPTORS: (*Safety valves, *Pressure regulators, Hydraulic actuators, Design, Tests, Guided missiles, Solenoids, *Control valves.) (*Gas valves, Specifications, Test methods, Tests.)

Information and data are given which are pertinent to the design, development, and testing of non-modulating pressure control valves. A technical note describing the early phases of the contract, assembly and detail drawings of the developed units, and certain specifications is presented. Assembly drawings of the developed valves are reproduced, together with the detail drawings of the major component parts. The specifications presented pertain to the pressure relief valve and define the basic component requirements, the procedures required for assembly and acceptance testing, the detailed requirements for the demonstration tests, and a tabulation of the results of the performance demonstration tests. (Author)

AD-273 108 Div. 26
(TISTB/AW) OTS price $2.25

Northrop Corp., Hawthorne, Calif.
PROBLEMS AND PROCEDURES IN MAINTAINABILITY.
Rept. for Mar 60-Mar 61 on Development of a Guide to Integrated System Design for Maintainability,
by Lynn V. Rigby and Joel I. Cooper. Oct 61, 92p. incl. tables, 55 refs.
(Contract AF 33(616)7059, Proj. 7184)
(ASD TN 61-126) Unclassified report

DESCRIPTORS: (*Maintenance, Theory, Operation, Costs, Time, Production, Failure, Supplies.) (*Air force operations, Effectiveness, Maintenance personnel.)

A comprehensive analysis of the maintainability problem is presented. The discussion is based on a literature survey on maintainability and interviews with contractor and using command personnel. The fundamentals of the problem are presented, followed by a detailed analysis of the most influential elements. These elements are presented in a manner that makes an integrated explanation of maintainability a natural development of the material presented. The difficulty in measuring maintainability is discussed and recommendations for the improvement of these measurements are presented. (Author)

AD-273 176 Div. 26, 17
(TISTM/BRW) OTS price $3.60

Battelle Memorial Inst., Columbus, Ohio.
STUDIES OF INTERSTITIAL ELEMENTS IN TITANIUM ALLOY WELDMENTS.
Final rept.,
by W. J. Lepkowski and R. E. Monroe. 30 Sep 61, 38p. incl. illus. tables, 10 refs.
(Contract DA 33-019-ORD-3401)
(WAL TR 401.54/3) Unclassified report

DESCRIPTORS: (Chemical impurities, Contamination, Carbon, Hydrogen, Nitrogen, Oxygen, *Welding, *Titanium alloys, Aluminum alloys, Chromium alloys, Molybdenum alloys, Vanadium alloys, Hardness, Tensile properties, Mechanical properties.) (*Welds, *Welded joints, Welding rods, Grains (Metallurgy).) (Alloys, Metals, Heat treatment, Arc welds, Sheets, Tests, Impact shock, Deformation, Microstructure.)

Thirty filler metals with various levels of interstitial contamination were prepared from unalloyed Ti, Ti-6Al-4V, and Ti-13V-11Cr-3Al. Weldments were prepared with these experimental filler metals and 3 sheet alloys, Ti-6Al-4V, Ti-4Al-3Mo-1V, and Ti-13V-11Cr-3Al. The 2 alpha-beta alloys (Ti-6Al-4V and Ti-4Al-3Mo-1V) were welded in the aged condition. The all-beta alloy (Ti-13V-11Cr-3Al) was welded in the solution-treated condition. The preweld heat-treated condition selected showed the effects of interstitial elements. All mechanical-property studies were made in the as-welded condition without postweld heat treatment. Room-temperature bend ductility and notch toughness measurements were made from -40 to 65 C. A complete interstitial analysis of the weld metals was obtained. (Author)

AD-273 179 Div. 26, 17
(TISTM/BRW) OTS price $8.60

Chance Vought Corp., Dallas, Tex.
SHEET METAL FORMING TECHNOLOGY.
Interim technical engineering rept. no. 1, 1 Oct 61-31 Jan 62,
by W. W. Wood, R. E. Goforth and others.
31 Jan 62, 91p. incl. illus. tables, 12 refs.
(Contract AF 33(657)7314, Proj. 7-871)
(ASD TR 7-871, vol. 1)
Unclassified report

DESCRIPTORS: (Alloys, *Metals, *Sheets, Pipes, Cylindrical bodies, *Processing, Tools, Dies, Design, Analysis.) (Deformation, Explosive forming, Metal forming presses, Metal plates, Hydrostatic pressure, Electromagnetism, Hydraulic presses.) Beryllium, Stainless steel, Titanium alloys, Tool steel, Tungsten, Chromium alloys, Aluminum alloys, Molybdenum alloys, Nickel alloys, Cobalt alloys, Niobium alloys, Vanadium alloys, Solid state physics, Solids, Liquids, Gases, Industrial production, Handbooks.

The purposes of this project were to determine the inherent limitations of sheet metal forming processes, to develop the knowledge to significantly advance these processes, and to recommend the manner in which this can be accomplished. The report presents the initial effort taken in the analytical and experimental parts of the program. Principle results were obtained in developing the state of the art of sheet metal forming through a survey and in preparation for experimental testing by material procurement, tool development, and analysis of specimen types. (Author)

AD-273 191 Div. 26, 17
(TISTM/BRW) OTS price $2.60

Allegheny Ludlum Steel Corp., Brackenridge, Pa.
MOLYBDENUM ALLOY EXTRUSION DEVELOPMENT PROGRAM.
Interim technical engineering rept. no. 5, 15 Dec 61-15 Feb 62,
by P. A. Santoli. Feb 62, 7p. illus. tables.
(Contract AF 33(600)40861, Proj. 7-785)
(ASD TR 7-785, vol. 5) Unclassified report

DESCRIPTORS: (*Extrusion, Forging, *Molybdenum alloys (TZM), Titanium alloys, Zirconium alloys.) (Surface properties, Microstructure, Crystal structure.) (Metal forming presses, *Dies, Coatings, Lubrication, Design, Heat treatment.)

Seven T-shape extrusions of TZM (Mo alloy) were made from 3200 F to complete the evaluation of various die coating sources. The accomplishment of 3 good extrusions demonstrated that 2 die coating sources provided the best coatings. Added to the good coating source previously demonstrated, this makes 3 attractive sources. Future coatings will be confined to 1 or more of these 3 sources. Two T-shape extrusions were made from 3200 F to study the effect of high temperature solutioning treatments upon the extrudability of TZM. Severe die wash occurred during these extrusions resulting in poor surface quality. The coarse macrostructure observed in the billet material is probably related to this poor surface quality. (Author)

AD-273 238 Div. 26
(TISTP/FR) OTS price $2.60

Lincoln Lab., Mass. Inst. of Tech., Lexington.
AUTOMATIC MEMORY ARRAY PRODUCTION SYSTEM,
by Charles G. Ryan. 28 Feb 62, 10p. illus.
2 refs. (Rept. no. 51G-2)
(Contract AF 19(604)7400)
(AFESD TDR 62-61) Unclassified report

DESCRIPTORS: (Evaporation of Nickel alloys and Iron alloys and Deposits as *Thin films using Automatic, *Vacuum apparatus with Induction heating.)

This analysis describes the electrical and mechanical design and operation of a mechanism for the sequential production of magnetic films with a capacity of 48 arrays in an evaporation time of about 15 minutes. The system provides for two evaporant sources and a variety of possible switch-programmed sequences. (Author)

AD-273 281 Div. 26, 17, 30
(TISTM/BRW) OTS price $1.50

Westinghouse Electric Corp., Blairsville, Pa.
THE ESTABLISHMENT OF A VACUUM ARC MELTING CAPABILITY AT ASD.
Rept. for Apr 60-15 July 61, on Metallic Materials,
by D. R. Carnahan. Dec 61, 46p. incl. illus. tables.
(Contract AF 33(616)7459, Proj. 7351)
(ASD TR 61-385, pt. 1) Unclassified report

DESCRIPTORS: (Air force research, *Test facilities, *Vacuum furnaces, Electric arcs, Design, Operation.) (Alloys, Metals, *Melting, Grains (Metallurgy), Crystal structure.) Electrodes, Steel, Molybdenum alloys, Titanium alloys.)

A consumable vacuum arc furnace was modified and installed at ASD, Wright-Patterson Air Force Base. The furnace was designed to melt ingots which are 6 inches in diameter and approximately 16 inches in length. Design factors considered were substantial water cooling, good arc visibility, voltage sensitivity, stinger-rod rigidity and pumping capabilities. A total of 31 molybdenum -0.5% titanium alloy ingots were vacuum arc melted to check the furnace capabilities and to try different modes of grain refinement. Grain refinement of molybdenum -0.5% titanium was obtained. Other areas of discussion are hot-topping, hardness, and Ti content and distribution. (Author)

AD-273 338 Div. 26, 17
(TISTM/BRW) OTS price $3.00

Aeroprojects, Inc., West Chester, Pa.
DEVELOPMENT OF ULTRASONIC WELDING EQUIPMENT FOR REFRACTORY METALS.
Interim technical progress rept. 1 June-15 Dec 61,
by J. Byron Jones, Nicholas Maropis and others.
Dec 61, 172p. incl. illus. tables, 138 refs.
(Contract AF 33(600)43026, Proj. 7-888)
(ASD TR 7-888, Vol. 2)
Unclassified report

DESCRIPTORS: (Heat resistant alloys, Refractory materials, Metals, Alloys, Sheets, Metal plates, *Welding, *Ultrasonics, Energy, Transducers, *Industrial equipment.) *Welded joints, Nickel alloys, Niobium alloys (D-31), Cobalt alloys, Chromium alloys, Molybdenum alloys, Titanium alloys, Iron alloys, Steel, Stainless steel, Tungsten.

The demonstrated feasibility of ultrasonically welding thin sheets of Nb(D-31), Inconel X-750, Mo-0.5Ti, PH15-7Mo, Rene 41 and W was extended to heavier gages of these materials. Measurement of the acoustical energy required confirm values previously estimated by an equation devised during fundamental research work. Salient problems associated with high power ultrasonic transducer-coupling systems for welding machines were considered and solutions were formulated. Thus, the ultrasonic welding of both mono- and bi-metal combinations in gages up to 0.10 in. is considered feasible. Information pertinent to the development of ultrasonic welding equipment for joining such materials is summarized. A first approximation of the energy required was supplemented by new data obtained by ultrasonically welding these materials in gages up to 0.040 in. with a 6 to 8 Kw laboratory device; thus, confirming the feasibility of joining such materials and of developing the necessary equipment to produce such junctions in thickness up to 0.10 in. Pertinent information on transducer, coupler, and terminal element materials is presented. (Author)

AD-273 409 Div. 26, 17
(TISTM/BRW) OTS price $9.60

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson Air Force Base, Ohio.
PROBLEMS IN CASTING PRODUCTION TECHNOLOGY (SELECTED ARTICLES),
by V. D. Khramov, Ye. V. Mishakov and others.
28 Feb 62, 82p. incl. illus. tables.
(Trans. no. FTD-TT-61-219 of Voprosy Tekhnologii Liteynogo Proizvodstva, Trudy Instituta, Moskva, no. 49:pp. 5-46, 1961)
Unclassified report

DESCRIPTORS: (Industrial production, Manufacturing methods, Metals, Crystallization, *Casting.) USSR.

Contents:
Casting of Large-Size Thin-Walled Parts by the Directional Stage Crystallization Method, by V. D. Khramov and Ye. V. Mishakov
Pressure Casting and Its Hydrodynamic Foundations, by V. Ya. Tarutin and Ye. S. Stebakov

27. PROPULSION SYSTEMS

AD-273 073 Div. 27
(TISTB/LH) OTS price $2.60

Lockheed Aircraft Corp., Sunnyvale, Calif.
PLASTIC AND COMPOSITE MATERIALS USED IN ROCKET MOTORS, NOZZLES AND PRESSURE VESSELS. AN ANNOTATED BIBLIOGRAPHY. PART I,
comp. by A. A. Beltran and G. R. Evans.
10 May 60, 26p. (Special bibliography no. SB-60-17, pt. 1)
Unclassified report

DESCRIPTORS: (*Rocket motors, *Rocket motor nozzles, *Pressure vessels, Plastics, Materials, Filament wound construction, Jatos.) *Bibliography.

AD-273 093 Div. 27, 12, 17, 25
(TISTM/BRW) OTS price $2.60

Aerojet-General Corp., Sacramento, Calif.
AN INVESTIGATION OF THE STRUCTURAL CHARACTERISTICS OF SUBSCALE MINUTEMAN CHAMBERS OF LADISH D-6ac STEEL,
by J. J. Zettek. 1 Mar 62, 6p. illus. tables.
(Rept. no. 0162-01TN-11)
(Contract AF 33(600)36610)
(BSD TDR 62-13) Unclassified report

DESCRIPTORS: (Guided missiles, Surface to surface, Rocket motors.) (*Rocket cases, *Steel (D-6ac), Structures, Stresses, Analysis, Measurement, Ellipsoids, Cylindrical bodies, Deflection, Deformation, Hydrostatic pressure, Tensile properties, Failure (Mechanics), Design.) (Test equipment, Strain gages.)

An investigation was made of the structural integrity of 37.5-in.-diam subscale Minuteman chambers made of Ladish D-6ac steel. Three chambers were used in the 5-phase test. In Phases I through IV, stresses were measured with the chambers subjected to proof pressure (600 psi) at ambient temperature. Phase V was a burst test with the pressurizing oil at 340 F. A maximum stress of 224,000 psi was recorded at proof pressure and occurred at the forward closure during the Phase II stresscoat test. The maximum deflection recorded at proof pressure was 0.618 in.; this was longitudinal expansion of the forward crown of the chamber. The maximum radial growth of the cylinder at proof pressure was 0.110 in. In the Phase V burst test, the cylindrical section failed in hoop tension at 768 psi, which is 128% of proof pressure. Test results indicate the structural adequacy of the chamber at proof pressure. Data obtained are applicable to second-stage Minuteman case designs. (Author)

AD-273 147 Div. 27, 10
(TISTA/SEB) OTS price $2.60

Phillips Petroleum Co., Bartlesville, Okla.
GAS TURBINE AND JET ENGINE FUELS.
Bimonthly progress rept. no. 6,
by W. L. Streets. Jan 62, 23p. incl. illus. tables, 5 refs.
(Contract NOw 61-0590-d)
Unclassified report

DESCRIPTORS: (*Turbojet engines, Duct inlets, *Guide vanes, Reliability, Corrosion, Sulfur, Sea water, Tests.) (Combustion chambers, Combustion chamber liners, Corrosion, Erosion, Flames, Combustion chamber gases, Tests.) (Hydrocarbons, *Jet engine fuels, Combustion, High temperature research.) Stainless steel, Test equipment.

Effects of sulfur in jet fuels and ingested sea water on the durability of engine hot section components was studied by evaluating the presence of guide vane test pieces on flame tube metal loss at 1600 F, sea water on 304 and 310 stainless steel flame tubes at 1600 F with 1.0% sulfur fuel, sulfur and sea water on Udimet 500 simulated turbine guide vanes at 1600 and 2000 F (2-inch combustor), and metal durability. The presence of guide vanes in the 2-inch combustor decreases flame tube metal loss, preventing comparison with earlier tests without vanes. Sea water caused an apparent increase in 310SS flame tube loss when guide vanes were present, but did not when vanes were absent. 310SS flame tubes showed marked decrease in durability with increasing temperature from 1350-1650 F with 1% sulfur fuel. Udimet 500 guide vanes were not adversely affected by either 1% sulfur or sulfur plus ingested sea water at 1600 F (2-inch combustor). At 2000 F Udimet 500 guide vanes were only slightly affected by 1% fuel sulfur. At 2000 F in the Microburner Udimet 500 guide vanes lost about one-half as much metal in 10 hr as 304 stainless steel in 3 hr (based on sulfur-free fuel runs) and were not detrimentally affected by 1% added fuel sulfur. (Author)

AD-273 297 Div. 27, 14, 17
(TISTM/BRW) OTS price $1.00

Defense Metals Information Center, Columbus, Ohio.
AN EVALUATION OF MATERIALS FOR ROCKET-MOTOR CASES BASED ON MINIMUM WEIGHT CONCEPTS,
by W. P. Achbach and R. J. Runck. 8 Mar 62, 30p. incl. illus. tables (DMIC memo. no. 147)
(Contract AF 33(616)7747)
Unclassified report

DESCRIPTORS: (*Rocket cases, Materials, *Steel, *Titanium alloys, Laminates, Filament wound construction, Glass textiles, Plastics, Effectiveness, Design.) (Stresses, Deformation, Mechanical properties, Physical properties, Buckling, Elasticity, Density.)

Comparisons are made between the properties of different construction materials, including steel, Ti, and glass, as potential materials for rocket-motor cases. These comparisons are useful in situations in which the highest strength-to-weight ratio is wanted: (1) where buckling is not critical, and (2) where buckling is critical. On a strength-to-weight basis, Ti alloys are superior to either steel or glass. Steel, however, exhibits the highest bending stiffness or the lowest deflection-to-density ratio. Glass-fiber-resin composites may have the potential to equal or exceed the strength-to-density ratio for Ti or the stiffness-to-density ratio for steel. However, at the operating temperatures of rocket-motor cases (350 to 600 F), glass-fiber composites suffer serious loss in bearing and shear strengths because of the deterioration of the properties of the epoxy resins now used as a binder. High-strength steel wire-resin composites may have the potential to exceed the properties of monolithic steel plate in some rocket-motor cases. As compared with monolithic Ti plate, high-strength Ti wire does not have sufficiently greater strength to indicate any advantages in rocket-motor cases. (Author)

AD-273 318 Div. 27, 12
(TISTA/VGW) OTS price $2.60

Naval Ordnance Test Station, China Lake, Calif.
THRUST-VECTOR CONTROL BY SECONDARY INJECTION,
by Foy McCullough, Jr. Jan 62, 24p. incl. illus. tables, 8 refs. (NOTS TP 2764)
(NAVWEPS rept. no. 7780)
Unclassified report

This paper was presented by the author at the Fourth Symposium on Ballistic Missile and Space Technology held at Los Angeles, California, 24-27 August 1959.

DESCRIPTORS: (Guided missiles, Control and Space flight, *Control systems using Jets, Injection of Gases, Liquids into *Rocket motor nozzles for Deflection of Exhaust gases, Thrust.) (Tests using Water, Nitrogen, Tetroxides, Nitric acid.)

The technique of thrust-vector control by injection of a fluid into the exhaust stream of a nozzle (secondary injection) was explored. This paper gives a survey of work performed at the Naval Ordnance Test Station during Fiscal Year 1959, previously reported in IDP 765. Both cold-gas (air) data with 3-dimensional and 2-dimensional nozzles and data obtained with a liquid-propellant applied-research motor (LPARM) are presented. Fluids studied with the LPARM were N_2O_4, N_2 (gas), H_2O, and IRFNA. Physical parameters as well as fluid properties were considered in the tests. Injection of a secondary fluid increases the main thrust of the motor as well as producing a side thrust. Thrust-vector control by secondary injection is simpler and more reliable than mechanical controls and shows promise of becoming a replacement for them. (Author)

AD-273 333 Div. 27, 9
(TISTA/WAW) OTS price $9.10

United Nuclear Corp., White Plains, N. Y.
TRANSPIRATION AND FILM COOLING FOR SOLID PROPELLANT ROCKET NOZZLES,
by Seymour Hyman, Carson Kuo and others.
7 Feb 61, 101p. incl. illus. tables, 233 refs.
(Rept. no. NDA 2150-1)
(Contract DA 30-069-ORD-3094)
Unclassified report

DESCRIPTORS: (*Rocket motor nozzles, Solid rocket propellants, Cooling, *Sweat cooling and *Film cooling with Gases and Liquids, Design, Tests, Mathematical analysis, Manufacturing methods.) (Coolants, Physical properties, Handling, Storage.) (Materials, Metals, Refractory materials, Physical properties.) (Turbulent boundary layer, Heat transfer, Mathematical analysis, Tests.)

The fundamental aspects of film cooling and transpiration cooling employed as thermal protection systems for solid-propellant rocket nozzles were studied in detail. Liquid evaporative film cooling and two-phase transpiration cooling appear to be the most attractive systems. While the studies have indicated that evaporative liquid film cooling is an immediately applicable thermal protection system, the experimental results show that a two-phase transpiration system is fundamentally stable in operation, and offers advantages from a coolant weight requirement standpoint. A concept for an experimental, transpiration-cooled nozzle was presented in preparation for additional experiments. (Author)

AD-273 346 Div. 27, 10
(TISTA/SEB) OTS price $2.60

Bendix Systems Div., Bendix Corp., Ann Arbor, Mich.
PARTICLE PHASE THERMAL EMISSION OF EXHAUST PRODUCTS,
by J. Santomieri. 15 Jan 62, 16p. illus. 5 refs.
(Rept. no. FS-62TN-1023)
(Contract AF 04(694)26)
Unclassified report

DESCRIPTORS: (*Particles in Rocket motor nozzles, *Exhaust gases, *Thermal radiation, Temperature, Mathematical analysis, Equations of Motion.) (Rocket motors, Rocket fuels, Cesium compounds, Nitrates, Aluminum.)

A simplified study was undertaken to determine the properties of the particle phase of a cesium nitrate-aluminum rocket fuel at the exit section. The particle phase of the cesium-nitrate rocket exhaust system appears as one of the major contributors to the total radiation of such a system. For a spectrum of particles ranging from approximately 2 to 20 microns, the continuum radiation will spread from the visible region well into the infrared. For Al particles, which sustain temperatures over 4000 R, the total radiation from exhaust products, which is approximately 30% solid phase, will be primarily from these particles. Wide band spectral observations will be dominated by the radiation from these particles. For gas exhaust temperatures of approximately 10,000 R, the radiation from the strongest line of neutral cesium will be difficult to resolve from the continuum background with spectrographic resolution of the order of 1 Angstrom. The continuum radiation in the 8521 Angstrom region from 6 micron particles, for instance, would emit at a rate of .003 watts/A-ster-ft while the cesium line here would emit at a rate of .00001 watts/ster-ft. Exit gas temperature in the vicinity of 1400 R would be required to permit neglecting the continuum radiation in any spectrographic measurement. (Author)

AD-273 430 Div. 27, 17
(TISTA/WAW) OTS price $2.60

Arde-Portland, Inc., Paramus, N. J.
COOLED SOLID PROPELLANT ROCKET NOZZLES.
Summary rept. no. 2, 1 Oct-31 Dec 61,
by Philip Wacks. 31 Dec 61, 18p. incl. illus. 1 ref.
(Contract DA 30-069-ORD-3099)
Unclassified report

DESCRIPTORS: (Rocket motors, Solid rocket propellants, *Rocket motor nozzles, Adapters for Installation, Cooling, Film cooling, Convection, Liquid cooled, Tests, Design, Test methods.) (Coolants, Liquid metals, Lithium, Physical properties, Handling, Test equipment.) (Lithium, Electromagnetic pumps, Flowmeters, Tests.) (Spray nozzles, Film cooling, Test equipment.)

Operational tests of the lithium flow console assembly were made. System design was checked out. Lithium handling techniques, system clean-out and operating procedures, and electromagnetic pump and flow meter characteristics were established. Fabrication of fully instrumented uncooled nozzles was completed. Fabrication of nozzle to motor case adapters was completed. The convective cooled nozzle successfully passed hydro-test and has been accepted. An oxidation-resistant coating of tin and aluminum has been applied to the nozzle. A lithium flow console has been designed to be used specifically in tests of the spray film cooled nozzle. (Author)

28. PSYCHOLOGY AND HUMAN ENGINEERING

AD-273 097 Div. 28
(TISTB/CCH) OTS price $1.25

Arizona State U., Temple.
INVESTIGATION OF SPECTRAL ESTIMATION.
Rept. for 1 Feb 60-15 Oct 61 on Psychological Research on Human Performance,
by Irwin Miller and John E. Freund. Dec 61, 42p. incl. illus. 11 refs.
(Contract AF 33(616)6857, Proj. 7183)
(ASD TR 61-714) Unclassified report

DESCRIPTORS: (*Behavior, Man, Effectiveness, Job analysis, Mathematical analysis, *Mathematical computer data.) (Psychology, Theory.)

Several problems of spectral estimation relevant to the determination of human-operator response characteristics were investigated. Techniques for analyzing the relationships among a set of stochastic processes are described, and the distribution of proposed spectral estimators is discussed. Tests for normality and stationarity are developed. A discussion of the analysis of multicomponent systems is also presented. (Author)

AD-273 438 Div. 28
(TISTB/LH) OTS price $8.10

Engineering Psychology Lab., U. of Pittsburgh, Pa.
INVESTIGATIONS OF MACHINE-ASSISTS TO OPERATOR PERFORMANCE: II. AN ILLUSTRATIVE GUIDE TO THE APPLICATION OF MACHINE-ASSIST PRINCIPLES,
by Harold C. Strasel, Richard A. Regan, and Robert Glaser. Oct 61, 76p. refs. (Technical rept. no. 2)
(Contract Nonr-62411)
Unclassified report

DESCRIPTORS: (*Handbooks, *Human engineering, *Job analysis.) (*Perception, Behavior, Motor reactions, Psychomotor tests.) (Control systems, Tracking, Coding, Display systems, Design, Operation, Effectiveness.)

The possibilities were investigated of incorporating behavioral principles into man-machine system design to facilitate human operator performance of perceptual-motor type tasks. Tasks were conducted by review and analysis of studies in the literature in terms of a Task by Task-variable matrix generated for this purpose. Results of the analysis indicate 33 of the 42 cells of the matrix contain data (studies of variable effects) relevant to the machine-assist aim. A small portion of these cells demonstrate task-variable effects suggestive of relatively direct application to machine design of machine-assists to operator performance. Discussion is given of the implications and limitations of the machine-assist concept. (Author)

29. QUARTERMASTER EQUIPMENT AND SUPPLIES

AD-273 175 Div. 29
(TISTB/CCH) OTS price $.50

Pioneer-Central Div., Bendix Corp., Davenport, Iowa.
LIQUID OXYGEN CONVERTER FOR WEIGHTLESS ENVIRONMENT.

Rept. for 20 Jan 59-6 Mar 61 on Equipment for Life Support in Aerospace,
by Dale L. Hankins and Paul J. Gardner. Nov 61, 11p. incl. illus.
(Contract AF 33(616)6190, Proj. 6373)
(ASD TR 61-634) Unclassified report

DESCRIPTORS: (*Oxygen equipment for *Weightlessness in *Space environmental conditions.) (Pressure breathing, Liquefied gases, Oxygen.) Design.

A liquid oxygen converter has been designed to supply breathing oxygen in a weightless environment. The converter is self pressurizing, using small quantities of liquid oxygen which are directed into a pressure build-up circuit where the liquid oxygen is vaporized and expanded to create and maintain operating pressure. The random orientation of the liquid oxygen in a weightless environment is overcome by a flexible hemispherical diaphragm attached to the inner end of the supply port. By application of build-up pressure to the exterior of the diaphragm, the collapsing diaphragm forces liquid to and through the supply port. Testing that could be accomplished in the laboratory gave every evidence that the design concept is satisfactory for weightless operation. (Author)

30. RESEARCH AND RESEARCH EQUIPMENT

AD-273 024 Div. 30
(TISTP/TL) OTS price $9.60

Microwave Research Inst., Polytechnic Inst. of Brooklyn, N. Y.
THE SIGNIFICANCE OF SENSITIVITY IN FEEDBACK SYSTEM STUDIES,
by W. A. Lynch and J. G. Truxal. 1 June 61, 107p. incl. illus. (Research rept. no. PIBMRI-866-60)
(Contract AF 18(603)105)
(AFOSR-1540) Unclassified report

DESCRIPTORS: (*Feedback, *Sensitivity, Functions, Signal-to-noise ratio, *Errors.) (*Mathematical logic, *Control systems, Reliability, Design.) (Nonlinear systems, Commutators, Experimental data, Tables.)

The sensitivity function is the fundamental measure of the effectiveness of feedback, in controlling the effects of both parameter variations and unwanted noise signals. After a preliminary discussion of the significance of the sensitivity function, methods for the simple calculation of the sensitivity are presented; methods valid whenever the over-all transmission is a bilinear function of the varying parameter (thus, whenever the parameter is a circuit elememt or the transmittance of a controlled source). The sensitivity function yields simple evaluations of the parameter margins, the amount by which specific parameters must be varied to cause system instability. The parameter margins can be evaluated directly from the frequency-domain plots utilized in normal system design. This interpretation of the sensitivity function is of importance not only in the logical design for simultaneous control of several sensitivity functions, but also in the identification problem. Extensions to the study of nonlinear systems can be effected if a frequency-independent describing function can be defined. (Author)

AD-273 148 Div. 30, 5
(TISTE/CDM) OTS price $3.60

Panoramic Radio Products, Inc., Mount Vernon, N. Y.
DEVELOPMENT OF SPECTRUM ANALYZER AND TEST GENERATOR FOR SINGLE SIDEBAND TRANSMITTER CHARACTERISTIC MEASUREMENTS.
Final engineering rept.
1962, 32p.
(Contract NObsr-75318)
Unclassified report

DESCRIPTORS: (*Radiofrequency spectrum analyzers, High frequency, *Signal generators, Audiofrequency, *Test sets, Design.) (Sidebands, Radio transmitters, Test equipment, Transistors, *Naval equipment, Specifications.)

Two pieces of test equipment for measuring various single sideband (SSB) transmitter characteristics in naval ship and shore installations were developed. One item was a high frequency spectrum analyzer. The other was a two-tone audio generator to furnish a modulating signal to the transmitter. A description is given of each piece of equipment and its components. Specifications are given for transistorized versions of the test sets. (Author)

AD-273 159 Div. 30
(TISTP/WH) OTS price $8.60

Texas U., Austin.
MACHINE LANGUAGE TRANSLATION STUDY.
Quarterly progress rept. no. 10 for 1 Aug-31 Oct 61 on Research on the Machine Translation of German,
by E. D. Pendergraft. 31 Oct 61, 1v. 6 refs.
(Contract DA 36-039-sc-78911)
Unclassified report

DESCRIPTORS: (*Machine translation, Language, *Germany.) Probability.

Implementation of the Language Translation System is discussed. A heuristic procedure for resolving a syntactic ambiguities is treated. The procedure makes use of a stochastic grammar proposed by Solomonoff. Discovery methods for use by the linguist in compiling grammars, and methods for grammar revision, are also presented. (Author)

AD-273 185 Div. 30, 15
(TISTP/MFA) OTS price $1.60

Microwave Research Inst., Polytechnic Inst. of Brooklyn, N. Y.
STUDY ON APPLICATION OF CODING THEORY.
Semi-annual rept. no. 3, 1 June-31 Dec 61,
by A. E. Laemmel. 15 Jan 62, 16p. incl. illus. 10 refs. (Rept. no. PIBMRI-895.3-62)
(Contract DA 36-039-sc-78972, Proj. 3A99-20-001-07)
Unclassified report

DESCRIPTORS: (*Coding, Theory by *Algebras, Matrix algebra for *Digital computers.) (Statistical distributions, Statistical tests, Groups (Mathematics).)

An abstract algebra is defined which satisfies the requirements for a symbol string algebra for both simple and compound codes. It is believed

that the abstract postulational definition is sufficiently narrow to permit theorems about codes to be proved entirely within the algebra, and thus to extend to compound codes such concepts as ergodicity. A method for constructing inverse codes (decoding methods) is also given, as well as a new theorem on structure functions. (Author)

AD-273 225 Div. 30, 8
(TISTE/CDM) OTS price $13.00

HRB-Singer, Inc., State College, Pa.
RADIO FREQUENCY ANECHOIC LABORATORY DESIGN STUDY,
by R. Wolfe, E. Erickson and others. Nov 61, 174p. incl. illus. tables, refs. (Rept. no. 289.1-F)
(Contract AF 30(602)2445)
Unclassified report

DESCRIPTORS: (Radiofrequency, Microwave frequency, *Electromagnetic waves, *Wave transmission, *Anechoic chambers, Design, Specifications, Instrumentation.) (*Test facilities for Radiofrequency, Interference, Measurement, Antenna radiation patterns, Electromagnetic shielding, Resonance absorption, Materials.)

Requirements of an RF anechoic chamber designed to perform as a general radiation measurements laboratory were studied. Primarily, the chamber would be used to perform radio frequency interference measurements on military equipment. The intended uses criteria are established to obtain the requirements for minimal performance and for optimum performance resulting in specific design values for a chamber to meet either of these two sets of requirements. The investigation extends to present a theoretical review of RF absorber and shielding material characteristics and their application to chamber design, and a derivation of geometrical shapes for both two dimensional and three dimensional radiation pattern measurements. Finally measurement techniques are considered with regard to the improvement of chamber performance characteristics by instrumentation discrimination. (Author)

AD-273 235 Div. 30, 15
(TISTP/TL) OTS price $11.50

Litton Systems, Inc., Waltham, Mass.
STUDY PROGRAM OF PATTERN RECOGNITION RESEARCH.
Final rept., 1 Jan-31 Dec 61,
by George S. Sebestyen and Alice K. Hartley.
31 Dec 61, 142p. incl. illus. tables, 4 refs.
(Contract AF 19(604)8024, Proj. 5632)
(AFCRL 62-65) Unclassified report

DESCRIPTORS: (*Programming, Pattern recognition, *Sampling, *Data processing systems, Automatic, Decision theory, *Statistical analysis.) (Digital computers, Tests, Signal-to-noise ratio.) (Integral equations, Matrix algebra, Time, *Transformations (Mathematics), Sequences, Taylor's series, Statistical distributions, Probability, Inequalities.)

The basic element in the solution of pattern recognition problems is a requirement for the capability to recognize membership in classes. This analysis considers the automatic establishment of decision criteria for measuring membership in classes that are known only from a finite set of samples. Each sample is represented by a point in a suitably chosen, finite-dimensional vector space in which a class corresponds to a domain that contains its samples. Boundaries of the domain in the vector space can be expressed analytically with the aid of transformations that cluster samples of a class and separate classes from one another. From these geometrical notions a generalized discriminant analysis is developed which, as the sample size goes to infinity, leads to decision-making that is consistent with the results of statistical decision theory. (Author)

AD-273 241 Div. 30, 6, 15
(TISTP/TL) OTS price $10.50

Melpar, Inc., Watertown, Mass.
APPLICATION OF RECOGNITION THEORY TO MISSILE IDENTIFICATION AND DECOY DISCRIMINATION, VOLUME 2.
Semi-annual rept. no. 2.
30 Jan 62, 140p. incl. illus. tables, refs.
(Contract AF 30(602)2420, Proj. 4983)
Unclassified report

DESCRIPTORS: (*Statistical analysis, Theory as applied to Decision theory, *Guided missiles, *Identification and Discriminators (Decoy).) (Digital computers, Coding, Signal-to-noise ratio, Communications theory, Digital converters, Numerical methods and procedures, Matrix algebra, Probability, Integral equations, Transformations (Mathematics).)

This analysis consists of nine sections, each discussing some aspect of the pattern-recognition problem: approximate decision techniques, variant forms of analysis, problems of representation, and some tests on the automatic recognition of formant-tracked speech. For any given pattern of information, whether optical, acoustical, etc., a fundamental problem is the problem of constructing a representation of such a pattern amenable to analysis for the purposes of recognition. One possible technique is discussed of representing continuous wave forms as a finite dimensional vector without simply time sampling. An application is made to the speech waveform. More and more effort will be made in the fundamental representation problem of particular types of patterns as time goes on. (Author)

AD-273 256 Div. 30, 2
(TISTA/WAW) OTS price $.50

National Aeronautics and Space Administration, Washington, D. C.
CERAMIC VACUUM ULTRAVIOLET ION CHAMBERS,
by Alfred K. Stober. Mar 62, 18p. incl. illus. table, 6 refs. (Technical note D-1180)
Unclassified report

Also available from NASA, Wash. 25, D. C., as NASA Technical note D-1180.

DESCRIPTORS: (Space environmental conditions, *Ultraviolet radiation, Measurement by *Ionization chambers, Manufacturing methods, Design, Calibration, Vacuum apparatus.) (Satellite vehicles, Space probes, Instrumentation.) (Materials, Ceramic materials.)

A new ceramic ion chamber for making vacuum ultraviolet radiation measurements in the laboratory and outside the earth's atmosphere has been developed. This detector has excellent electrical insulating properties and a high work function. It is practically imperviable to the toxic effects of gases. An improved window-sealing technique aids in prolonging its life

span. A detailed description of the fabrication, gas filling, and sealing techniques is presented. The ion chamber calibration procedure is briefly outlined. The usefulness of the chamber in the 1050-1500A spectral region is noteworthy because the detector can be made to operate over a relatively narrow bandpass with a sharp cutoff (rejection of photons) on either side of the selected wavelength region. Other useful properties include the high quantum yield, the extremely low noise level, and the capability to serve as a gas-gain multiplier. (Author)

AD-273 300 Div. 30, 15
(TISTP/TL) OTS price $10.10

Grumman Aircraft Engineering Corp., Bethpage, N. Y.
A SURVEY OF THE GENERAL THEORY OF EFFECTIVELY COMPUTABLE FUNCTIONS,
by Frank B. Cannonito and Gerald D. Fogel.
Feb 62, 115p. incl. illus. tables, 48 refs.
(Research rept. no. RE-153)
Unclassified report

DESCRIPTORS: ((Abstract) *Theory of Effectiveness of (Computable) *Functions.) (*Automation, Statistical analysis (Decision theory), *Mathematical logic, *Metamathematics, Matrix algebra, Analysis (Recursive), (Recursive functions) Computers.)

The general theory of effective computability is surveyed to transmit to engineering and scientific personnel the basic concepts. Specifically, the notion of algorithm is introduced and made precise via the theory of Turing computability. After the concept of partial computability follow sections on finite automata - where the theory of Rabin and Scott is developed - and formal axiomatic systems - where the limitive theorems of Church, Godel and Tarski are stated. The survey develops in detail the theory of recursive functions concluding with some of the well-known solvable and unsolvable cases of decision problem theory. A recapitulation of the limitive theorems of formal axiomatics in terms of recursive function theory is made. Several topics of interest in current research which draw upon the prior development of the survey are also presented. (Author)

AD-273 321 Div. 30, 1, 28
(TISTA/VGW) OTS price $19.75

Martin Co., Baltimore, Md.
AIR FORCE FLIGHT CONTROL AND FLIGHT DISPLAY INTEGRATION PROGRAM.
Rept. on Human Engineering Support to the Air Force Flight Control and Flight Display Integration Program,
by J. E. Brown, C. A. Gainer and others. Dec 61, 328p. incl. illus. tables, refs. (Engineering rept. no. 12191)
(Contract AF 33(616)7752)
Unclassified report

DESCRIPTORS: (Statistical tests of Flight instruments, *Display systems, Instrument dials, Control panels, Instrument panels, Numbers, Coding, Design, Effectiveness for Pilots, Reading, Human engineering.) (Statistical analysis, Sampling, Public opinion polls.)

AD-273 322 Div. 30, 17, 26
(TISTM/BRW) OTS price $3.60

Armour Research Foundation, Chicago, Ill.
DEVELOPMENT OF RESISTANCE STRAIN GAGES USABLE UP TO 1600 F.
Rept. 21 June 55-21 June 56,
by G. Stevens and J. P. Sheehan. 23 Jan 62, 32p. incl. illus. tables (Rept. no. NAVAIRMATCEN-ASL-1050, pt. 1)
(Contract N156S-32317)
Unclassified report

DESCRIPTORS: (*Strain gages, Materials, Wire, Iron alloys, Chromium alloys, Aluminum alloys, Drawing (machine processing).) (Thermal stresses, Measurement, Airframes, Aircraft, Structures, Aerodynamic heating.) High temperature research, Calibration, Thermal expansion, Resistance, Electrical conductance.

To measure stresses produced in aircraft structures by aerodynamic heating, a quasi-static high temperature strain gage is required which exhibits good stability characteristics. In the present application it was desired to measure large strains in the temperature range 1000 to 1600 F. Refractory single phase alloys with Fe, Co, and Ni bases were selected for exploration as strain gage wires. Besides good oxidation resistance it was aimed to achieve a low temperature coefficient of resistance and matching expansivity with the chosen base material. The solid solution alloys of the Fe-Cr-Al composition approached most closely the ideal requirements for high temperature strain gage wires. Several alloys in this group were vacuum melted and the hot and cold forming properties were determined. Fe-25 Cr-5 Al, Fe-25 Cr-7.5 Al, and Fe-20 Cr-10 Al alloys ultimately were drawn into 0.001 to 0.002-in.-diam wires. Strain gages fabricated from these wires were cemented to Inconel test bars and preliminary gage calibrations were made at elevated temperatures. (Author)

AD-273 347 Div. 30, 15, 23
(TISTB/CCH) OTS price $21.00

California U., Los Angeles.
AN INVESTIGATION OF SAMPLED DATA MODELS OF THE HUMAN OPERATOR IN A CONTROL SYSTEM.
Doctoral thesis,
by George A. Bekey. Feb 62, 342p. incl. illus. tables, refs. (Rept. no. 62-6)
(Contract AF 33(616)7139, Proj. 8225)
(ASD TDR 62-36) Unclassified report

DESCRIPTORS: (*Mathematical computer data, *Human engineering, *Radar operators, Behavior, Tracking.) (Radar tracking, Control systems.) (*Computers, Linear systems, Nonlinear systems, Statistical analysis.)

An analytical and experimental study of a new class of human operator models, based on discrete rather than continuous operations is presented. A systematic study of the implications of intermittency by means of the theory of sampled-data control systems is described. The resulting models are consistent with the large body of experimental evidence concerning tracking. For the inputs considered, the outputs from the sampled-data models have certain characteristics which approximate experimental data more closely over a wider range of frequencies than those obtained from the quasi-linear continuous models. Systematic procedures for construction of the proposed sampled-data model are presented, beginning with the measure-

ment of power spectra and cross-spectra of the system. A preliminary analysis of transient response and stability of sampled data systems with variable sampling rates is presented as an introduction to the study of adaptive sampled-data models. (Author)

AD-273 348 Div. 30
(TISTP/TL) OTS price $3.60

California U., Los Angeles.
A SURVEY OF TECHNIQUES FOR THE ANALYSIS OF SAMPLED-DATA SYSTEMS WITH A VARIABLE SAMPLING RATE,
by George A. Bekey. Feb 62, 28p. incl. illus. 22 refs. (Rept. no. 61-24)
(Contract AF 33(616)7139, Proj. 8225)
(ASD TDR 62-35) Unclassified report

DESCRIPTORS: (Analysis of *Data processing systems, *Sampling, Feedback, Control systems.) (*Difference equations, Transformations (Mathematics), Integration, Matrix algebra.)

Several techniques are presented for the analysis of sampled-data systems with a non-constant sampling period. The application of z-transform techniques is limited to cases where the sampling pattern repeats periodically; Several special cases, including the cyclically-varying sampling period and the skipped-sample problem are outlined. The most general methods available are based on a direct solution of the system difference equations. These equations, while time consuming, do make possible the evaluation of transient response sample-by-sample. The advantages, limitations and possible extensions of the various methods are outlined. A number of simple examples and an extensive bibliography are included. (Author)

AD-273 403 Div. 30, 8
(TISTP/WH) OTS price $1.60

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson Air Force Base, Ohio.
ON THE APPLICABILITY OF BINARY CORRECTING CODES IN TRANSMISSION CHANNELS OF DISCRETE INFORMATION,
by L. M. Fink. 13 Feb 62, 12p. incl. illus. tables, 8 refs. (Trans. no. FTD-TT-62-45 of Radiotekhnika 16, no. 10, pp. 3-9, 1961)
Unclassified report

DESCRIPTORS: (*Coding, Sequences, Probability, *Errors, *Information theory, Inequalities.) (Radio signals, Transmission, *Data transmission systems, Noise (Radio).) USSR.

Using asymptotic expressions for the equivalent probability of error, the conditions of acceptability are derived for a correcting code. These conditions are satisfied by very few of the codes described in the literature. In channels with fading, these conditions may be made less rigid if the measure and decorrelation of error are taken in constructing the code. (Author)

AD-273 414 Div. 30
(TISTP/TL) OTS price $6.60

Thomas J. Watson Research Center, Yorktown Heights, N. Y.
GRAPHIC COMPOSING TECHNIQUES.
Final rept.
1 Feb 62, 67p. incl. illus. tables.
(Contract AF 30(602)2527)
(RADC TDR 61-310) Unclassified report

DESCRIPTORS: (*Digital computers, Coding, *Language, *Translations, *Data processing systems, Automation.)

The need for a high quality, low fatigue readability text led to the development of an output composition system. The requirement for handling material which cannot be printed on an output flexowriter further enhanced the need for such a system. This report describes the input handling techniques, the edit instruction conversion by table lookup on the photoscopic memory system, the Linofilm unit, and the 704 program employed for format composition. Samples illustrating the output available from both the output flexowriter and the composing system are included. (Author)

AD-273 440 Div. 30
(TISTP/TL) OTS price $7.60

Stanford Research Inst., Menlo Park, Calif.
GRAPHICAL DATA PROCESSING RESEARCH STUDY AND EXPERIMENTAL INVESTIGATION.
Quarterly progress rept. no. 6, 1 July-31 Dec 61, by A. E. Brain, N. J. Nilsson and others. Dec 61, 63p. incl. illus. 11 refs.
(Contract DA 36-039-sc-78343, Proj. 3A99-22-001-02)
Unclassified report

DESCRIPTORS: (*Data processing systems, *Data storage systems, *Identification systems, Programming, Automatic, Training devices, Teaching machines, Indexes, Coding, Documentation.) (*Military research, *Computer logic, *Digital computers.) (Topology, Aerial photography, Maps, Video networks.) (Experimental data, Tables, Feasibility studies.) (Transformations (Mathematics), Matrix algebra.)

The trainability of learning machines is discussed. A non-mathematical descriptive treatment is presented, covering the fundamentals of elementary machines. An attempt was made to develop an intuitive appreciation of why these machines work. A mathematical description is then given of the geometrical interpretation of successive transformations by which a pattern at the machine input becomes a point in the classification space, and of a test for linear separability. Task E was completed with a survey of indexing and retrieval of non-alphanumeric graphical information for military purposes. There appear to be no basic methodological problems to prevent the development of an index that provides complete and systematic reference to all significant topological features or man-made objects shown on printed maps and aerial photographs. (Author)

AD-273 443 Div. 30, 15
(TISTP/TL) OTS price $9.10

Sylvania Electric Products, Inc., Waltham, Mass.
OPTIMUM SPEECH SIGNAL MAPPING TECHNIQUES.
Final technical rept.,
10 Jan 62, 94p. incl. illus. tables, 5 refs.
(Rept. no. F 428-1)
(Contract AF 30(602)2446)
(RADC TR 62-3) Unclassified report

DESCRIPTORS: (*Research program administration, Theory and Test methods of Mathematical analysis, *Mapping of *Speech transmission, *Signals.) (Analysis, Synthesis of Data, Sampling.) (Time, Functions, Series, Fourier analysis.) (Programming, Digital computers, Communications theory.)

Investigations of the analysis of speech and

speech-like waveforms in terms of an exponential orthogonal function series were carried out. The analysis and resynthesis of speech was accomplished via a digital computer programmed to operate upon digitized speech data. Connected speech consisting of two spoken sentences was successfully analyzed and resynthesized using the methods advocated and developed. The resynthesized speech is of such quality that both the phonetic information and the identity and quality of the speaker's voice are preserved. Thus the developed analysis methods appear to have significant relevance to future application in the analysis of speech for both automatic speech recognition machines and for speech compression communications channels. (Author)

31. SHIPS AND MARINE EQUIPMENT

AD-273 027 Div. 31, 9, 15
(TISTP/MFA) OTS price $4.60

Davidson Lab., Stevens Inst. of Tech., Hoboken, N. J.
ANALYTICAL STUDY OF THE THRUST DEDUCTION OF A SINGLE-SCREW THIN SHIP.
Rept. on Fundamental Hydromechanics Research Program,
by Stavros Tsakonas and Winnifred R. Jacobs.
9 Mar 62, 44p. incl. illus. tables, 11 refs.
(Rept. no. 816)
(Contract Nonr-26319)
Unclassified report

DESCRIPTORS: (*Ship hulls, Ship models, *Marine propellers, *Hydrodynamics.) (Thrust and Torque in Bodies of revolution, Drag.) (Bessel functions, Polynomials, Harmonic analysis.)

The problem of the hull-propeller interaction is of practical importance; knowledge of the functional dependence of the thrust deduction force on various aspects of the hull-propeller configuration is essential to achieving the most economical condition for a self-propelled vessel. Although this problem has attracted many investigators, the dependence of the thrust deduction force on parameters such as axial clearance, propeller geometry and performance characteristics, ship-afterbody geometry and thrust has not been satisfactorily defined. In the present study the functional dependence of potential thrust deduction fraction on the geometry of the propeller-hull configuration and on propeller performance characteristics will be considered for thin ships. The fact that the thrust deduction develops in a region of the afterbody at most two propeller-diameters away from the propeller, where most conventional ships are slender, is justification for assuming that the thin-ship model represents very nearly the actual vessel afterbody. (Author)

AD-273 261 Div. 31, 25
(TISTW/RD) OTS price $9.10

Defense Research Lab., U. of Texas, Austin.
BARGE TESTS OF FLUID ACOUSTIC FILTERS AND EXPERIMENTAL STUDY OF NOISE TRANSMISSION PATHS.
Technical rept.
by J. V. Kahlbau. 12 Feb 62, 30p. illus.
(DRL Acoustical rept. no. 195)
(Contract NObs-77033)
Unclassified report

DESCRIPTORS: (Tests on Barges for Determination of Effectiveness of *Acoustic filters for Attenuation, Reduction of *Submarine noise caused by Liquids in Pipes.) *Sound transmission, Acoustics, Instrumentation, Accelerometers, Vibration isolators.

Research covers tests of acoustic filters and experimental work on noise transmission. The tests were conducted aboard test barges. Purposes of the tests, the equipment used in carrying them out, and the procedures followed are described. Attempts to determine relative magnitudes of over-side noise contributions from various sound transmission paths were not successful, because in certain instances unavoidable changes in noise path characteristics accompanied changes in test conditions. Sound pressures measured in shallow water 10 ft from a steel pontoon cell inside of which sound fields were established in air are given for random noise and for noise produced by playback of a recording of sound near a submarine drain pump. Band level differences between noise in the pontoon and in surrounding water in 11 third-octave bands above 100 cps averaged 14.5 db for random noise and 16 db for pump noise. (Author)

32. MISCELLANEOUS ARTS AND SCIENCES

No Entries

33. TRANSPORTATION

AD-273 061 Div. 33
(TISTB/AW) OTS price $4.60

Boeing Co., Renton, Wash.
MATS CARGO TRENDS,
by John C. Jackovich. 20 Dec 61, rev. 20 Feb 62, 40p. incl. illus. tables (Rept. no. TSR 754)
Unclassified report

DESCRIPTORS: (*Air transportation, *Cargo, Data, Statistical analysis.)

This report presents results of a statistical analysis of MATS cargo data reported quarterly from April-May-June 1959 thru AMJ 1961. The period reported on covers nine quarters. Warehouse measurement of outbound total cargo and outsize cargo was reported in quarterly totals by each of the five MATS U. S. terminals - Charleston, Dover, McChord, McQuire, and Travis. Measurements of weight, cube, number of pieces, and number of shipments were reported. (Author)

31. SHIPS AND MARINE EQUIPMENT

32. MISCELLANEOUS ARTS AND SCIENCES

33. TRANSPORTATION

NON-MILITARY AND OLDER MILITARY RESEARCH REPORTS

*Descriptors marked with an asterisk are included in the subject index.

BIBLIOGRAPHY

AD-269 650 $0.75

Armed Services Technical Information Agency, Arlington, Va.
LOGISTICS. AN ASTIA REPORT BIBLIOGRAPHY, by Herman W. Miles. Jan 62, 40p. 212 refs.

DESCRIPTORS: *Logistics, *Supplies, *Strategic materials, Supply depots, Military mobilization, Military operations, Procurement, Control, *Management engineering, Transportation, *Bibliography.

This bibliography was prepared in response to frequent requests for information on logistics, and because of the Defense Department's continuing interest in the effective procurement, management, and distribution of supplies. Citations are included for documents cataloged by ASTIA from 1953 through 1 December 1961. References are alphabetically arranged by subject areas concerning logistics management, materials handling, procurement, strategic materials, and transportation. Within each subject area, reports published by military agencies are listed alphabetically by source and title reports published by Department of Defense contractors are cited by source, contract and date. (Author)

BEHAVIORAL SCIENCES

AD-270 868 repriced $1.00

American Inst. for Research, Pittsburgh, Pa.
A PRELIMINARY PROCEDURE FOR SYSTEMATICALLY DESIGNING PERFORMANCE AIDS, by John D. Folley, Jr. Rept. for Apr 60-Mar 61 on Research on a Handbook for the Preparation of Job Aids and Guides, Contract AF 33(616)7233. Oct 61, 34p. 28 refs. ASD TR-61-550.

DESCRIPTORS: *Industrial psychology, Applied psychology, *Job analysis, Personnel, Effectiveness, Human engineering, Design.

Four steps in the design of performance aids are presented: (1) identification of task elements for which aids should be provided (2) determination of appropriate functional characteristics of aids for these task elements (3) specification of the physical design characteristics of the aids to carry out the functions and (4) evaluation, modification, and updating of the aids. Supplementary data on capabilities of performance aids are presented for use with the procedure. The procedure is untried and of necessity uses stopgap solutions to problems on which much research or development is needed. (Author)

Human Engineering

AD-271 066 repriced $0.50

Behavioral Sciences Lab., Aerospace Medical Div., Wright-Patterson AFB, Ohio.
HUMAN ENGINEERING PRINCIPLES OF DESIGN FOR IN-SPACE MAINTENANCE, by Leroy D. Pigg. Rept. on Human Performance in Advanced Systems. Nov 61, 15p. 17 refs. ASD Technical rept. 61-629.

DESCRIPTORS: *Maintenance, *Maintenance personnal, Reaction (Psychology), Remote control systems, Design, *Human engineering, Space flight, *Spaceships, Manned, Maintenance equipment.

Results of research on problems related to human performance of maintenance actions in space systems are reviewed. The interactions of sensory, psychomotor, and motor functions are discussed, along with problems of remote-handling applications in the space environment. (Author)

PB 181 179 $5.00

Institute for Applied Experimental Psychology, Tufts U., Medford, Mass.
HUMAN ENGINEERING BIBLIOGRAPHY 1959-1960. Rept. on Contract Nonr-494(13). Oct 61, 349p. 367 refs. ONR rept. ACR-69.

DESCRIPTORS: *Human engineering, Indexes, *Bibliography.

Contents:
Part I
Topical outline of the literature in human engineering
Part II
Facsimile of subject matter files
Part III
Alphabetical index to the human engineering literature

Part IV
Key to abbreviations found in abstracts
Key to abbreviations of military and government organizations
Citations and abstracts
Part V
Author index

Personnel and Training

PB 157 921 $1.60

Bureau of Naval Personnel, Washington, D. C.
DEVELOPMENT AND STANDARDIZATION OF THE OFFICER SELECTION BATTERY FORMS 3 AND 4, by John J. La Gaipa. Jan 61, 15p. 2 refs. Technical Bulletin 61-4.

DESCRIPTORS: *Officer personnel, Naval personnel, Selection.

PB 159 032 $1.60

Bureau of Naval Personnel, Washington, D. C.
DEVELOPMENT OF THE OFFICER QUALIFICATION TEST FORMS 7 AND 8, by Allen N. Smith, Isaiah Guttman, and others. Sep 61, 18p. 2 refs. Technical Bulletin 61-14.

DESCRIPTORS: *Officer personnel, Naval personnel, Aptitude test, Selection.

BIOLOGICAL SCIENCES

TID-13432 $1.10

Jefferson Medical Coll., Philadelphia, Pa.
TRANSPLANTION OF PRESERVED BONE MARROW BETWEEN ANIMALS AND FROM ONE HUMAN BEING INTO ANOTHER, by Leandro M. Tocantins. Rept. on Contract AT(30-1)-1982. 10 Aug 61, 4p.

PB 159 878 $1.10

Naval Medical Research Inst., Bethesda, Md.
SIMILARITIES BETWEEN SCHIZOGONY AND SPOROGONY IN PLASMODIUM, by Clay G. Huff. Vol. 12, p. 129-136. 30 Apr 54, 9p. 18 refs. Research rept. on Project NM-005 048.01.08. 30 Apr 54, 9p. 18 refs. AD-40 579.

DESCRIPTORS: *Malaria, *Plasmodium, Physiology, Reproduction.

Although the literature on malaria emphasizes the differences between schizogony and sporogony, evidence is presented here to show their essential similarity. The evidence is (a) cytological and (b) chemotherapeutic. If the concept is accepted that sporogony (agamogony) is merely the first generation of schizogony which happens to take place before the change of hosts, it is believed that such a concept will materially aid research on both the schizogonic and sporogonic phases of the life cycle. (Author)

Anatomy and Physiology

AD-270 869 repriced $0.50

Aerospace Medical Lab., Aeronautical Systems Div., Wright-Patterson AFB, Ohio.
EFFECTS OF POSTURE ON CARDIOVASCULAR CHANGES INDUCED BY PROLONGED WATER IMMERSION, by Duane E. Graveline. Rept. for March-May 61, on Biophysics of Flight. Oct 61, 11p. 7 refs. ASD Technical rept. 61-563.

DESCRIPTORS: Space medicine, *Posture, *Weightlessness, Simulation, Water, Muscles, *Circulatory system, Blood pressure.

Previous hypodynamic research using water-immersion techniques was done with the subjects in a semi-reclining position. To evaluate the possible influences of posture and relative immobilization on the cardiovascular deterioration associated with prolonged water immersion, a technique was employed which allowed complete freedom of activity, position, and attitude. Five subjects were evaluated for functional change after 6 hours in this environment. The results indicate that postural factors play an insignificant role in the mechanism of cardiovascular alteration induced by water immersion. (Author)

PB 159 870 $1.60

Vision Research Labs., U. of Michigan, Ann Arbor.
VISUAL RECOGNITION ALONG VARIOUS MERIDIANS OF THE VISUAL FIELD. X: BINARY PATTERNS OF THE LETTERS "H" AND "O", by E. Rae Harcum. Rept. on Proj. Michigan [Contract DA 36-039-sc-52654]. Nov 58, 16p. 5 refs. Rept. no. 2144-308-T; AD-206 295.

DESCRIPTORS: Targets, *Visual perception, *Target recognition, Errors, Tachistoscopes, Position finding.

The results are reported of an investigation of human binary pattern reproduction accuracy for linear target arrays presented tachistoscopically in various meridians of the frontal plane of the visual field. Eight-element patterns of the printed letters "H" and "O" were presented at inclinations of 0, 45, 90, and 135 degrees to the horizontal such that half of the letters appeared on each side of the fixation point. Fewest errors in reproducing the target patterns were found for the horizontal target arrays. Most errors were made with the vertical target arrays. The numbers of errors made in reproducing target elements on opposite sides of fixation were approximately equal. (See also PB 142 787)

Biochemistry

PB 156 530 $1.10

Brussels U. (Belgium).
ROLE OF SULFHYDRYL AND DISULFIDE GROUPS, by J. Brachet. Summary rept. no. 1 on Contract AF 61(052)356. 24 Feb 61, 2p. AFOSR-606.

DESCRIPTORS: *Thiols, Thio radicals, *Ethanols, *Sulfides, *Lipoic acids, Acids, *Biochemistry, Embryos, Pigments, Inhibition, Growth.

Experiments on the role of sulfhydryl and disulfide groups in morphogenesis have been performed at both the biological and biochemical levels.

TID-14972 $1.10

Northwestern U, Evanston, Ill.
TECHNICAL PROGRESS REPORT (ON METABOLISM IN NERVOUS SYSTEM). Rept. on Contract AT(11-1)-891. 1961. 7p.

Medical Specialties and Equipment

PB 159 703 $1.10

Langley Porter Neuropsychiatric Inst., San Francisco, Calif.
THE COMPARATIVE CLINICAL EVALUATION OF PERIOD AND FREQUENCY ANALYSIS OF EEG'S, by Charles L. Yeager and Enoch Callaway, III. [1961]9p. 13 refs.

DESCRIPTORS: *Electroencephalography, Frequency analyzers, Periodic variations, Medical equipment.

This paper deals with the comparison of two analyzers. The Grey Water analyzer functions in the frequency domain, and the Burch analyzer in the time domain. The correspondence in data between the resonant circuit and period systems of analysis is high in the alpha range, low in the delta and beta ranges, and negligible above 30 cycles per second. Each system gives specific data lost in the other system. (Author)

PB 159 839 $1.10

National Institutes of Health, Bethesda, Md.
STEREOTAXIC INSTRUMENT. [1961] 7p. 2 refs.

DESCRIPTORS: *Stereoscopes, Design, Electrode holders, Motion, Ophthalmology, Instrumentation.

The stereotaxic machine designed by Talbot, Marshall, and Gowbels in 1939 has been modified about 1948 in the mechanism for lateral movement of the electrode holders.

Radiobiology

HW-72107 $0.50

Hanford Atomic Products Operation, Richland, Wash.
THE UPTAKE OF STRONTIUM FROM DIET AND WATER BY RAINBOW TROUT, by R. H. Schiffman. Rept. on Contract AT(45-1)-1350. Dec 61, 7p. 6 refs.

ORINS-39 $2.00

Oak Ridge Inst. of Nuclear Studies, Tenn.
MEDICAL DIVISION REPORT FOR 1960. Rept. on Contract AT(40-1)-GEN-33. 74p. 36 refs.

TID-14995 $2.60

Pittsburgh U., Pa.
RADIOECOLOGY OF A FOSSORIAL RODENT ALONG AN ALTITUDINAL TRANSECT, by C. A. Tryon, Jr. Progress rept. 1 Jan-31 Dec 62, on Contract AT(30-1)-2579. 22p.

CHEMISTRY

PB 181 186 $0.50

Naval Ordnance Lab., White Oak, Md.
QUALITATIVE AND QUANTITATIVE ASPECTS OF THE KINETICS AND MECHANISMS OF PYROLYSIS OF EPOXIDE POLYMERS, by Hugh C. Anderson. Jan 62, 20p. 9 refs. NOLTR 61-147.

DESCRIPTORS: *Epoxides, *Polymers, Pyrolysis, Gravimetric analysis, Infrared spectroscopy.

The pyrolysis of two epoxide polymers has been investigated, using the techniques of isothermal and non-isothermal gravimetry, infrared spectroscopy, and molecular distillation. Both materials were alike with the exception that one had a longer chain between the epoxide groups. The kinetics of pyrolysis of these two polymers were found to be essentially the same although some small differences were observed in the infrared spectra of their pyrolysis products. (Author)

Analytical Chemistry

NAA-SR-6765 $0.50

Atomics International, Canoga Park, Calif.
AN X-RAY AND DENSITY STUDY OF NON-STOICHIOMETRY IN URANIUM OXIDES, by W. A. Young, L. Lynds and others. Rept. on Contract AT(11-1)-GEN-8. 30 Mar 62, 20p. 24 refs.

PB 157 794 $1.60

Naval [Propellant Plant] Indian Head, Md.
ASSAY OF 2-NITRODIPHENYLAMINE, by S. G. Cook and C. L. Whitman. 7 Nov 50, declassified 10 June 58. 11p. 1 ref. NPF memo rept. no. 7.

DESCRIPTORS: *Amines, *Phenyl radicals, *Nitro radicals, Gravimetric analysis, Volumetric analysis.

Volumetric and gravimetric methods of chemical analysis for the assay of 2-nitrodiphenylamine are described; advantages and disadvantages of the methods are discussed, and tables of the results obtained by the different procedures are given. (Author)

PB 157 796 $1.60

Naval [Propellant Plant] Indian Head, Md.
COMPARISON OF HEAT OF EXPLOSION RESULTS FROM FOUR LABORATORIES USING RDX AS THE STANDARD SAMPLE, by Samuel Goldhagen. 14 Nov 51, declassified 10 June 58. 12p. 6 refs. NPF Memo. rept. no. 14.

DESCRIPTORS: *RDX, *Explosions, Heat, Measurement, Tests, Propellants, Powders.

Heat of explosion was determined for an RDX sample by four laboratories using the same test procedure. The results of the four laboratories check within experimental error showing conclusively that there are no unusual errors due to operators or to the apparatus used. (Author)

PB 157 792 $1.60

Naval [Propellant Plant] Indian Head, Md.
EXTRACTION LOSS OF NITROGUANIDINE WITH METHYLENE CHLORIDE CONTAINING VARIOUS AMOUNTS OF WATER, IN COMPARISON WITH CAR BON TETRACHLORIDE, by H. Stalcup and W. S. Lui. 8 May 53, declassified 10 June 58. 14p. Memo. rept. no. 40.

DESCRIPTORS: *Guanidines, *Nitro radicals, Solubility, Solvent extraction, *Methanes, *Chlorides, *Carbon tetrachloride, Solvent action, Moisture.

The relationship between the solubility loss of nitroguanidine and the moisture content of the extracting solvent, methylene chloride, was determined. The solubility loss of nitroguanidine after extraction with carbon tetrachloride and methylene chloride, respectively, having the same moisture content, was also determined for purposes of comparison. (Author)

PB 157 793 $2.60

Naval [Propellant Plant] Indian Head, Md.
NITRATION OF CELLULOSE WITH BORON TRIFLUORIDE NITRIC ACID MIXTURES, by J. S. Bednarik, J. J. Kelly, Jr., and J. A. Gallaghan. 17 July 53, declassified 10 June 58. 21p. 6 refs. Memo. rept. no. 43.

DESCRIPTORS: *Cellulose, Nitration, Boron compounds, Fluorides, Nitric acid, Mixtures, Complex compounds, Chemical reactions, Heat tolerance, Stability, Viscosity, *Nitrocellulose, Stabilization.

A laboratory study was made of the use of the boron trifluoride nitric acid complex as a nitrating medium for cellulose linters. Heat stability, percentage nitrogen and viscosity studies were made and are tabulated. A considerable shortening of boiling time necessary for stabilization of the nitrocellulose was obtained by the use of boron trifluoride nitric acid complex in nitration. Viscosities of the nitrocellulose were higher from this complex compared to those obtained from the H_2SO_4-HNO_3 nitrating mix. (Author)

PB 157 795 $1.60

Naval [Propellant Plant] Indian Head, Md.
A PRELIMINARY STUDY OF THE COLLOIDING ACTION OF DIMETHYL NITRAMINE ON NITROGUANIDINE, by M. Knoll. 15 Oct 51, declassified 10 June 58. 11p. NPF Memo. rept. no. 10.

DESCRIPTORS: *Guanidines, *Nitro radicals, Solvent extraction, Solubility, *Nitramines, *Methyl radicals, Colloids, Solvent action, Vapor pressure.

PB 157 797 $1.60

Naval [Propellant Plant] Indian Head, Md.
A TENTATIVE METHOD FOR THE ANALYSIS OF RDX AND NITROGUANIDINE IN DOUBLE BASE PROPELLANT POWDERS, by S. G. Cook, C. L. Whitman and others. 29 July 52, declassified 10 June 58. 12p. 2 refs. Memo. rept. no. 26.

DESCRIPTORS: *Propellants, *Powders, *RDX, *Guanidines, *Nitro radicals, Chemical analysis.

A method is described for the analysis of a double-base powder containing nitrocellulose, nitroglycerin, nitroguanidine and RDX. The RDX and nitroguanidine are separated by extraction with 2% sodium hydroxide solution after a preliminary extraction of the propellant with acetic acid and petroleum ether. A second method is reported for the determination of RDX in a double-base powder containing no nitroguanidine. The procedure described herein is essentially the same as that given in NPF Technical Report No. 26(1), and depends on the fact that RDX is soluble in hot 65% acetic acid and does not interfere with the regular methods for determining nitroglycerin and centralite. The RDX is determined by difference. (Author)

K-1463 $0.50

Oak Ridge Gaseous Diffusion Plant, Tenn.
URANIUM ISOTOPE MEASUREMENTS WITH A MODEL SU-1 SURFACE IONIZATION MASS SPECTROMETER, by V. L. Warren and J. C. Horton. Rept. on Contract W-7405-eng-26. 22 Mar 62, 13p. 5 refs.

VUP-2202 $2.00

Edgerton, Germeshausen and Grier, Inc., Boston, Mass.
TECHNICAL PHOTOGRAPHY OF SURFACE MOTION. Preliminary rept. Plowshare program. Jan 62, 68p. AD-273 760.

VUP-2001 $0.50

Sandia Lab., Albuquerque, N. Mex.
MICROBAROGRAPH MEASUREMENTS. Plowshare Program. Project Gnome. Jan 62, 20p. 8 refs.

Climatology and Meteorology

AD-265 223 $15.00

Collins Radio Co., Dallas, Tex.
DEVELOPMENTAL WEATHER RADAR RECEIVER, by R. A. Nichols. Final engineering rept. on Subcontract to Marine Lab., U. of Miami Contract NOas 60-6026-c. Aug 61, 229p. Rept. no. CER-T1094; Marine Lab. rept. 8824-4 and ML-61278.

DESCRIPTORS: *Meteorological radar, Search radar, *Radar receivers, Radar equipment, Electronic circuits, Design, Parts catalogs, Hurricanes, Storms, Analysis.

Problems encountered during the initial design and corrective action effected are discussed. Theory of operation, block diagrams, test data, graphs, and alignment procedures are included. The appendix sections contain the schematic diagrams of the units, voltage and resistance measurements, photographs, and a parts list on a module basis. (Author)

PB 157 566 $2.60

Washington U. [Seattle].
ON VALLEY AND MOUNTAIN WINDS II, by Norman Thyer and Konrad J. K. Buettner. Final rept. on Contract AF 19(604)5578. May 61, 23p. AFCRL-250.

DESCRIPTORS: *Wind, Motion, Velocity, Meteorological balloons, Mountains.

In an attempt to answer the question of the source of air for the anti-wind, observations were made both on a ridge forming one side of the valley (in conjunction with the cross-section) and, in the proximal part of the valley, using no-lift balloons as well as those having the standard rates of ascent.

PB 158 711 $7.60

Weather Bureau, Washington, D. C.
FURTHER CIRCULATION STUDIES IN THE GREENLAND AREA BASED ON OBSERVED WINDS, by W. L. Schallert. Supplement to Quarterly rept. no. 3, 1 May-31 July 60, on Proj. DA 3-99-00-500. Nov 60, 80p. 2 refs. MIPR no. R-65-8-99831-SC-03-91.

DESCRIPTORS: Greenland, *Wind, *Upper atmosphere, Meteorological charts, *Weather forecasting.

This supplement is concerned with an examination of winds aloft observed at seven Greenland stations and the one at Alert, N. W. T.

Geology

RME-4525(Rev.) $0.50

Atomic Energy Commission. Div. of Raw Materials, Washington, D. C. [and] Instituto de Investigaciones Geologicas, Santiago (Chile).
RECONNAISSANCE FOR URANIUM IN THE IQUIQUE AREA, PROVINCE OF TARAPACA, CHILE, by William A. Bowes, Paul H. Knowles and others. Oct 58, 11p. 3 refs.

TID-14861(Vol. I) $10.50

Lamont Geological Observatory, Columbia U., Palisades, N. Y.
ISOTOPIC GEOCHEMISTRY, by J. Laurence Kulp. Volume I, main body of rept. on Contracts AT(30-1)-1114 and AT(30-1)-1669. 15 Jan 62, 137p. 103 refs.

TID-14861(VOL. II) (App. A) $13.50

Lamont Geological Observatory, Columbus U., Palisades, N. Y.
ISOTOPIC GEOCHEMISTRY, by J. Laurence Kulp. Rept. on Contracts AT(30-1)-1114 and AT(30-1)-1669. 15 Jan 62, 191p. 80 refs.

Oceanography

PB 181 181 $1.00

Naval Civil Engineering Lab., Port Hueneme, Calif.
THE EFFECTS OF MARINE ORGANISMS ON ENGINEERING MATERIALS FOR DEEP-OCEAN USE, by James S. Muraoka. 7 Mar 62, 39p. 77 refs. Technical rept. R-182.

DESCRIPTORS: Marine biology, Aquatic animals, Sea water, Physical properties, *Materials, Exposure, *Deterioration, Microorganisms, Oceanography, *Marine borers.

A literature survey was made of the effects of marine organisms on various types of engineering materials, particularly in deep-ocean environments. Numerous materials such as manila ropes, cotton fishing nets, petroleum hydrocarbons, rubber products, steel, submarine cables (telegraph and telephone), concrete, and cork (floats) have been attacked and destroyed by various marine organisms in various depths, from shallow protected waters to ocean depths exceeding 7,200 feet. Marine organisms which have been observed to be responsible for the destruction of these materials include species of wood- and rock-burrowing animals, purple sea urchins, sharks, fish, and microorganisms. A proposed field and laboratory study to accumulate further biological and engineering data about the relative behaviors of various materials to marine biological deterioration is presented. (Author)

PB 181 182 $1.50

Naval Civil Engineering Lab., Port Hueneme, Calif.
HARBOR SCREENING TESTS OF MARINE BORER INHIBITORS. IV, by H. Hochman and T. Roe, Jr. 13 Feb 62, 53p. 10 refs. Technical rept. 184.

DESCRIPTORS: *Marine borers, Control, Inhibition, Wood, Impregnation, Resistance, *Materials, Tests, Creosote, Inorganic substances, Metalorganic compounds, Organic compounds.

The Laboratory is exposing wood panels impregnated with various materials to determine their resistance to attack by marine borers. This report lists the results of harbor tests of treated panels removed from exposure between 15 Aug 60 and 15 Aug 61. It also lists all treated panels which have been exposed for one year or more and which have shown no attack or very slight amounts of attack. (Author)

TID-14965 $1.60

Woods Hole Oceanographic Institution, Mass.
BIOLOGICAL, CHEMICAL AND RADIOCHEMICAL STUDIES OF MARINE PLANKTON, by Bostwick H. Ketchum. Rept. on Contract AT(30-1)-1918. 15 Feb 62, 15p. WHOI Ref-62-4.

ENGINEERING

PB 159 865 $2.60

David Taylor Model Basin, Washington, D. C.
REDUCTION OF SEAKEEPING DATA AT THE DAVID TAYLOR MODEL BASIN, by Wilbur Marks and Paul Strausser. July 59, 29p. 2 refs. Rept. 1361.

DESCRIPTORS: Model basins, Data, Reduction, *Data processing systems, Data storage systems, Analog computers, Computers, Scheduling, *Ships, Motion.

The method of autocovariance-transform digital analysis is shown to be deficient for some problems. The filter-square analog method employed by the SEADAC (Seakeeping Data Analysis Center) is shown to be more generally applicable to all data-handling problems. Proposed extensions of the SEADAC to include cross-spectrum analysis and to provide greater efficiency are discussed. (Author)

CEX-60.6 $1.00

Edgerton, Germeshausen and Grier, Inc., Santa Barbara, Calif.
EXPERIMENTAL EVALUATION OF THE RADIATION PROTECTION PROVIDED BY AN EARTH-COVERED SHELTER, by Z. Burson and H. Borella. Feb 62, 44p. 14 refs.

KAPL-2180 $1.50

Knolls Atomic Power Lab., Schenectady, N. Y.
STRESS ANALYSIS OF A PRESSURE VESSEL HEAD WITH SQUARE HOLES, by Lorenzo Deagle. Rept. on Contract W-31-109-eng-52. 5 Feb 62, 60p. 3 refs.

PB 181 180 $1.00

Naval Civil Engineering Lab., Port Hueneme, Calif.
INVESTIGATION OF WIDE-GAGE PORTAL CRANE TRACK ALIGNMENT AND RUNNING GEAR, by J. J. Bayles and R. E. Jochums. Final rept. 21 Feb 62, 31p. 1 ref. Technical rept. 140.

DESCRIPTORS: Civil engineering, *Hoists, Model tests, *Vehicle tracks, Gears, Naval equipment, Design, Operation.

Scale-model studies were made to establish criteria for the design of portal crane track curves and to determine float requirements of the travel mechanism. Model studies were then made of problem situations at the Boston and Mare Island Naval Shipyards. (Author)

Aeronautical Engineering

AD-270 164 repriced $1.75

All American Engineering Co., Wilmington, Del.
THE USE OF A SHEAFFER SPRING TYPE ARRESTING HOOK AS AN ENGAGEMENT METHOD FOR ARRESTING LARGE JET TRANSPORTS, by Bruce R. Sheaffer. Final rept. on Contract FAA/BRD-304. Jan 62, 63p. 7 refs. M-657A.

DESCRIPTORS: Hooks, *Arresting gear, *Jet planes, Transport planes, Airplane landings, Tests, Effectiveness, Reliability, Landing aids.

The installation of a Sheaffer spring type arresting hook on a Boeing model 720 aircraft was subjected to an 18-day program of static, dynamic, and in-flight tests. The action of the hook and the installation's structural resistance to loading, which were satisfactorily demonstrated in the limited Boeing 720 aircraft arresting hook static and dynamic tests, were within the design parameters. It is concluded that this

proven hook installation is qualified, subject to hook shoe modification, for gross weight Boeing 720 aircraft arrestment tests with an appropriate arresting gear. (Author)

AD-270 188 repriced $4.00

Battelle Memorial Inst., Columbus, Ohio.
A STUDY OF PARAMETERS THAT MEASURE THE AIRWORTHINESS OF GAS-TURBINE-POWERED CIVIL AIRCRAFT, by F. L. Bagby, H. J. Grover, and others. Final rept. 1 June 60-31 July 61, on Contract FAA/BRD-239. 31 July 61, 286p. 188 refs.

DESCRIPTORS: Civil aviation, Aircraft, Airplane engines, Gas turbines, Reliability, Airframes, *Landing gear, Thermodynamics, Mechanics, Electrical equipment, *Navigation computers, Communication systems, Automatic pilot, *Hydraulic systems, *Pneumatic systems, *Air conditioning equipment, *Fuel systems, *Flight instruments, Control systems, Transport planes, Commercial planes, Short take-off planes, Vertical take-off planes.

A research study was conducted to relate measureable parameters to the airworthiness of gas-turbine-powered civil aircraft. The measurable parameters associated with the airframe, propulsion systems, mechanical systems, and electrical and electronic systems were included. Trend-analysis techniques can be used to indicate malperformance and predict some incipient mechanical failures for gas-turbine power plants and for some of the mechanical systems. A limited knowledge of materials and their modes of failure impeded the identification of useful parameters for most mechanical and electromechanical systems and for airframe elements. (Author)

PB 157 641 $6.60

Cornell U. Graduate School of Aeronautical Engineering, Ithaca, N. Y.
A THEORETICAL APPROACH TO A STUDY OF STALL-FLUTTER PROBLEMS, by Jack Morito Ii, Master's thesis. Rept. on Contract AF 49(638)544. June 61, 65p. 16 refs. AFOSR-899.

DESCRIPTORS: Theses, *Airfoils, *Flutter, Moments, Aerodynamics, Oscillation, Resonance, Vortices, Theory, Differential equations, Taylor's series.

An analytic approach is developed for the study of stall flutter with one degree of freedom in torsion. The aerodynamic moment is determined from quasi-steady theory. Two essential features are introduced. First, the nonlinear behavior is incorporated by expansion of the static moment curve in a Taylor series about the mean incidence angle for terms up to the third power in the effective angle of attack. Second, the influence of the Karman vortices shed from the given blade or from the aerodynamic interference of other blades is represented by a forcing amount of general harmonic form. The response of the system after a quasi-steady state is reached is found by application of the method of Kryloff and Bogoliuboff. The stability problem and the distinctive nonlinear characteristics such as the limit cycle and jump phenomena are clarified. An illustrative example together with a semi-empirical comparison with experimental results show considerable promise. (Author)

PB 156 461 $8.10

Guggenheim Aeronautical Lab., Calif. Inst. of Tech., Pasadena.
COMPARATIVE EXPERIMENTAL AND THEORETICAL STUDIES OF THE FLUTTER OF FLAT PANELS IN A LOW SUPERSONIC FLOW, by M. H. Lock and Y. C. Fung. Final rept. on Transonic Flutter, Contract AF 49(638)220. May 61, 88p. 24 refs. GALCIT-95; AFOSR-670.

DESCRIPTORS: *Airplane panels, *Flutter, Supersonics, Supersonic flow, Experimental data, Theory, Analysis.

A series of panel flutter experiments were performed in the GALCIT transonic wind tunnel. The preflutter panel motion and the motion during flutter were studied in detail. Flutter boundaries were obtained between Mach numbers 1.15 and 1.5. Three analytical studies of the flutter phenomenon, based upon conventional assumptions, are presented which facilitate comparison between theory and experiment. A detailed comparison between the theoretical and experimental results reveals considerable disagreement in the flutter boundaries at supersonic Mach numbers less than 1.4. The agreement between theory and experiment improves at the higher Mach numbers. The theory appears inadequate for the prediction of flutter boundaries at the lower supersonic Mach numbers. A possible cause of this inadequacy of the theory is discussed. (Author)

AD-271 913 repriced $7.00

Ramo-Wooldridge Div., Canoga Park, Calif.
THE APPLICATION OF STATISTICS TO THE FLIGHT VEHICLE VIBRATION PROBLEM, by Julius S. Bendat, Loren D. Enochson, and others. Rept. for July 60-June 61, on Dynamic Problems in Flight Vehicles, Contract AF 33(616)7434. Dec 61, 532p. 101 refs. ASD Technical rept. 61-123.

DESCRIPTORS: *Jet planes, Jet fighters, Jet bombers, Aircraft, *Guided missiles, *Spaceships, Satellite vehicles, Rockets, *Vibration, Statistical analysis, Probability, *Statistical processes, Quality control, Operation, Measurement, Instrumentation, Recording devices, Transducers, Voltmeters, Accelerometers, Flight testing.

The general problem is discussed from many aspects, and results are applicable to many other physical areas besides vibration. Detailed analytical engineering procedures are proposed for determining statistical properties of a single vibration record, and for establishing the over-all vibration environment from a collection of vibration records. Simple statistical techniques are developed for reducing the amount of data that needs to be gathered for later processing.

This technique can provide a low probability of missing an unexpected event, and a high probability of covering the range of expected events. Straightforward statistical tests are developed for testing fundamental assumptions of randomness, stationarity, and normality. Mathematical and physical distinctions are explained between different information obtained by measuring numerous important statistical parameters, such as an instantaneous amplitude probability density function, or a mean square acceleration power spectral density function, or an autocorrelation function. An engineering discussion is given of related instrumentation equipment available today in many laboratories, with emphasis on their statistical accuracy in measuring desired information.

AD-273 092 repriced $2.50

Sperry Gyroscope Co., Great Neck, N. Y.
STUDY AND DEVELOPMENT OF A NON-FLOATED INERTIAL QUALITY GYROSCOPE, by E. Luber and M. Klemes. Final technical rept. Mar 60-Dec 61, on Contract AF 33(616)6974. Feb 62, 117p. 1 ref. Rept. no. LA-4254-0187; ASD-TDR-62-80.

DESCRIPTORS: *Gyroscopes, Design, Construction, Test method, Test equipment, Tests, Inertial guidance, Instrumentation.

This report describes the design, development, and test of two small, non-floated, single-degree-of-freedom gyroscopes of inertial quality which employ a ROTORACE ^{R} gimbal suspension. The report includes descriptions of tests performed on these units which show that the following typical performance characteristics have been obtained: A random drift rate of 0.03^{o}/hr rms, a g-sensitive drift rate of below 0.2^{o}/hr/g, and a g^{2}-sensitive drift rate of 0.03^{o}/hr. (Author)

PB 158 265 $3.60

Sperry Phoenix Co., Ariz.
DEVELOPMENT OF EXTENDED CAPABILITIES FOR AN/ASW-12(V) AUTOMATIC FLIGHT CONTROL SYSTEM. Quarterly progress rept. no. 1, July 60-Mar 61, on Contract DA 36-039-sc-85181. 22 Mar 61, 40p. Rept. no. LJ-1263-0079-1.

DESCRIPTORS: *Automatic pilots, *Control systems, Flight testing, Aircraft, *Helicopters, Target drones, Stabilization systems, *Stabilization, Command systems.

A detailed review of the design progress on the Ground Operator Control and electro-mechanical rotary actuator high temperature development is presented. (Author)

Chemical Engineering

NAA-SR-6976 $0.50

Atomics International, Canoga Park, Calif.
OXIDATION-REDUCTION REPROCESSING OF URANIUM CARBIDE REACTOR FUEL. I. CARBOTHERMIC REDUCTION OF UO_2, by W. G. Smiley. Rept. on Contract AT(11-1)-GEN-8. 15 Mar 62, 25p. 18 refs.

TID-14993 $1.10

Engineering Research Labs., Columbia U., New York.
BASIC EXPERIMENTAL STUDIES ON BOILING FLUID FLOW AND HEAT TRANSFER AT ELEVATED PRESSURES, by Bruce Metzner. Monthly progress rept. for Jan 62 on Contract AT(30-3)-187. 31 Jan 62, 6p. MPR-XIII-1-62.

HW-70489 $1.25

Hanford Atomic Products Operation, Richland, Wash.
HYDRAULIC CHARACTERISTICS OF AIR-PULSED SOLVENT EXTRACTION COLUMNS, by V. L. Hammond. Rept. on Contract AT(45-1)-1350. Jan 62, 47p. 7 refs.

Electrical and Electronic Engineering

AD-270 457 repriced $1.50

Bolt, Beranek and Newman, Inc., Cambridge, Mass.
RESPONSE OF ELECTRONICS TO INTENSE SOUND FIELDS, by Dennis U. Noiseux, James J. Coles and others. Rept. for Jan-Dec 61 on Contract AF 33(616)7743. Nov 61, 46p. 5 refs. ASD TR-61-391.

DESCRIPTORS: Guided missiles, Electronic equipment, *Electronic circuits, *Printed circuits, Capacitors, Airborne, Acoustics, *Acoustic impedance, Vibration, Resonance, Acceleration, Reliability, Damping, Measurement.

The intense sound fields present in missiles and other flight vehicles may cause serious malfunction of electronic equipment. Efforts were made to determine the possible ways in which intense sound can excite electronic equipment, to localize the probable areas of failure or malfunction, and to propose testing procedures for electronic equipment. Two areas of possible malfunction were investigated. The first is the printed circuit board, which serves as the final supporting structure for an electronic component. It was found that the electrical noise output from biased condensers mounted on the printed circuit boards was in the order of 10 microvolts per g of acceleration. It was found, furthermore, that the usual hard

coatings applied to the boards tended to increase the electrical noise output. This was also observed to some extent when a hard plaster damping material was applied to the boards. The second area of investigation was the response of a rectangular box to acoustic and to vibration excitation. It was found that the acoustic transmissibility of the largest panel of the box was about unity at a resonance and 20 db below this off resonance. Other tests showed that the coupling of vibration among the sides of the box was predominantly by mechanical paths and, furthermore, that the transmissibility of vibration approached 30 db at certain resonances. (Author)

PB 158 860 $1.60

David Sarnoff Research Center, Princeton, N. J.
MOLECULAR AMPLIFIERS AND GENERATORS, by H. J. Gerritsen. Quarterly rept. no. 3, 1 Mar-31 May 61, on Contract DA 36-039-sc-87386. 6 June 61, 17p. 10 refs.

DESCRIPTORS: Microwaves, *Microwave amplifiers, Amplifiers, *Radiofrequency generators, Waveguides, Chromium, Titanium compounds, Dioxides, Relaxation time, Lattices, Design, Tantalum, Nickel, Microwave oscillators, Materials, Dielectric properties, Broadband, *Paramagnetic crystals, Ruby, Ions, Atomic spectrum, Paramagnetic resonance, Titanium, Magnetic fields, Measurement, Masers.

The dielectric constant and loss tangent of pure and doped rutile were measured at 24 kMc between 300°K and 4.2°K. Nickel doped rutile was studied and appears to be promising for a maser at about 300 kMc. One unsuccessful attempt was made to use Ta^{4+} for idler doping in a chromium doped rutile maser. (Author)

PB 158 835-1 $14.00

Electron Tube Research Lab., U. of Minnesota, Minneapolis.
STUDY OF THE CAUSE AND EFFECT OF FLICKER NOISE IN VACUUM TUBES. VOLUME I, by A. van der Ziel. Final rept. 15 Nov 57-31 Dec 59 on Contract DA 36-039-sc-74963. [1960] 202p. 107 refs. AD-239 327.

DESCRIPTORS: *Electron tubes, *Noise (Radio), Photomultipliers, Triodes, Pentodes, Secondary emission, Cathodes (Electron tubes), Display systems, Reduction, Impedance, Measurement, Diodes, Mathematical analysis.

Contents:
Noise in photomultiplier tubes
Flicker noise in triodes with positive grid
Flicker noise in pentodes, flicker partition noise
Secondary emission flicker noise
An anomalous flicker effect in tubes with oxide coated cathodes
Experiments on diodes with movable anode
Miscellaneous topics
Noise display machine
A noise suppression factor display circuit
A nonlinear effect upon the equivalent circuit of interface impedance in pulse methods
A new method for the measurement of cathode interface impedance
On the impedance and noise characteristics of cathode interface layers
Characteristics of the MgO cold cathode diodes
A new theory of flicker noise
(See also PB 158 835-2)

PB 158 835-2 $8.10

Electron Tube Research Lab., U. of Minnesota, Minneapolis.
STUDY OF THE CAUSE AND EFFECT OF FLICKER NOISE IN VACUUM TUBES. VOLUME II. Final rept. 15 Nov 57-31 Dec 59, on Contract DA 36-039-sc-74963. [1960] 90p. AD-239 328.

DESCRIPTORS: *Electron tubes, *Noise (Radio), Photomultipliers, Triodes, Pentodes, Secondary emission, Cathodes (Electron tubes), Display systems, Reduction, Impedance, Measurement, Diodes, Mathematical analysis.

Illustrations. For text see PB 158 835-1.

PB 157 390 $2.60

Electronics Research Lab., U. of California, Berkeley.
THE EFFECTS OF RF ENERGY ON THE PUMPING SPEED OF A TITANIUM SPUTTER PUMP, by J. F. Fry. Scientific rept. no. 13 on Contract AF 19(604)2270. 18 Apr 61, 21p. 3 refs. Series no. 60, Issue no. 355; AFCRL-324.

DESCRIPTORS: *Vacuum pumps, Titanium, Pumps, Tests, Radiofrequency power, Energy, Electrical effects, Electronic equipment.

For certain applications greater pumping speed of the sputter pump is desirable. The pumping speed is directly dependent on the strength of the applied magnetic field, the value of the anode voltage, and the area of the titanium cathodes. Pumping speed is not increased by the introduction of RF energy.

DC-60-6-712 $1.60

General Electric Co., Cincinnati, Ohio.
A COMPARISON OF COMMERCIAL TRANSISTORIZED FLIP-FLOP UNITS, by E. J. Clarkin. Rept. on Contract AT(11-1)-171. 6 June 60, 19p.

DC-59-8-217 $5.60

General Electric Co., Cincinnati, Ohio.
GENERALIZED 704 PROGRAM FOR LINEAR SYSTEM ANALYSIS, by J. W. Ryan. Preliminary rept. on Contract AT(11-1)-171. 19 Aug 59, 61p.

DC-60-3-166 $2.60

General Electric Co., Cincinnati, Ohio.
HALF-WAVE PUSH-PULL MAGNETIC VALVE DRIVE AMPLIFIER, by S. F. Hemmenway. Rept. on Contract AT(11-1)-171. 21 Mar 60, 30p.

DC-57-7-98 $7.60

General Electric Co., Cincinnati, Ohio.
AN INTRODUCTION TO MAGNETIC AMPLIFIERS, by Jack A. Russell. Rept. on Contracts AT(11-1)-171, AF 33(038)21102, and AF 33(600)38062. 8 July 57, 78p.

DC-59-1-89 $4.60

General Electric Co., Cincinnati, Ohio
NUMERICAL AND DIGITAL PROGRAM ANALYSIS FOR RESPONSE OF PNEUMATIC AMPLIFIER - EA PROBLEM NO. 7-1072. JOB NO. 50960 - ANP PROGRAM NO. 154, by J. A. Delaney. Rept. on Contract AT(11-1)-171. 2 Jan 59, 51p.

DC-60-4-63 $1.60

General Electric Co., Cincinnati, Ohio.
REPORT ON CURVED-TUBE PUSH-PULL CONTROL FOR 1000°F OPERATION, by J. L. DeWeese. Rept. on Contract AT(11-1)-171. Mar 60, 19p.

DC-59-2-101 $19.75

General Electric Co., Cincinnati, Ohio.
SOME FUNDAMENTAL PRINCIPLES OF FEEDBACK CONTROL SYSTEMS, by G. E. Gorker and J. C. Gelhard. Rept. on Contract AT(11-1)-171. 1 Jan 59, 326p.

DC-60-2-145 $3.60

General Electric Co., Cincinnati, Ohio.
TRANSISTORIZED D-C MICROVOLTMETER, by W. E. Sabin. Rept. on Contract AT(11-1)-171. 15 Feb 60, 38p.

DC-57-11-195 $3.60

General Electric Co., Cincinnati, Ohio.
THE USE OF PULSE TRANSFORMERS WITH FISSION CHAMBERS AND FISSION CHAMBER PREAMPLIFIERS, by G. K. Rusch. Rept. on Contract AT(11-1)-171. 29 Nov 57, 38p.

DC-60-3-124 $8.10

General Electric Co., Cincinnati, Ohio.
VIBRATION ANALYSIS OF P-103 SHIM SCRAM CONTROL ROD SYSTEM, by H. A. Eagle and F. D. Krieger. Rept. on Contract AT(11-1)-171. 15 Mar 60, declassified 5 Dec 61. 88p.

DC-60-3-226 $3.60

General Electric Co., Cincinnati, Ohio.
VOLTAGE AMPLIFIER ANALYSIS, by D. B. Zeh. Rept. on Contract AT(11-1)-171. 3 Sept. 59, 37p.

HASL-118 $0.50

Health and Safety Lab., Atomic Energy Commission, New York
THE EFFECT OF NOISE ON PULSE HEIGHT RESOLUTION, by Irving M. Meth and Robert T. Graveson. Jan 62, 17p. 5 refs.

PB 158 838 $3.60

Lansdale Div., Philco Corp., Pa.
DIFFUSED-BASE R. F. POWER OSCILLATOR JUNCTION TRANSISTORS, by J. A. Hastings. Quarterly progress rept. no. 3, 1 Jan-31 Mar 59, on Contract DA 36-039-sc-78051. [1959] 34p. Philco no. R 220.1; AD-218 566.

DESCRIPTORS: *Transistors, Production, Tests, *Radiofrequency oscillators, Circuits.

The first phase of the environmental evaluation program has been completed, and the results indicate a capability of meeting the most stringent test conditions. The transistors were subjected to 500 G shock, 12 G vibration fatigue, and 5, 10, 15, and 20,000 G centrifuge conditions during this period. A ten-to-one reduction has been achieved in the collector stud-to-germanium spacing through the use of a free fall stud soldering technique. The new technique also produces a higher yield of transistors through the virtual elimination of the factor of the operator's technique. Comparison of recently fabricated transistors to those produced in the early phases of this work demonstrates a considerable improvement in power handling capacity, the result of various improvements in processing techniques. The mutually agreed upon specification limits are included as Appendix A. (Author) (See also PB 142 763)

PB 158 717 $2.60

Mallory, P. R., and Co., Indianapolis, Ind.
HIGH POWER 400 CYCLE VIBRATORS AND ASSOCIATED TEST POWER SUPPLIES DEVELOPMENT, by Arthur J. Little and L. Deane Lake. Quarterly progress rept. no. 2, 15 Mar-15 June 59, on Contract DA 36-039-sc-78257. [1959] 28p. 9 refs.

DESCRIPTORS: *Vibrators, Design, *Power supplies.

An interrupter vibrator called Model B was developed. After some testing this gave way to Model C which can be considered a true prototype. Model C was tested as a 28 volt interrupter vibrator and gave very good results towards meeting electrical specifications. Arcing, however, was a problem on this model at these relatively high voltages. Several methods of eliminating this arcing are mentioned and an investigation of them shall be conducted. Model C with a few changes in parts is expected to provide a good self-rectifying vibrator. (Author)

AD-270 445 repriced $1.00

Naval Ordnance Lab., White Oak, Md.
A FOURIER ANALYSIS OF FIRING ANGLE WAVESHAPES, by Edward T. Hooper. 24 Nov 61, 34p. 1 ref. NOLTR 61-157.

DESCRIPTORS: *Nonlinear systems, Mathematical analysis, Harmonic analysis, *Fourier analysis, Circuits, *Wave analysis, Thyratrons, Electron tubes, Rectifiers, Semiconductors, Magnetic amplifiers, Firing circuits.

Sinusoidally excited nonlinear devices having an abrupt discontinuity in their characteristics exhibit a firing angle or saturation angle. This firing angle is controlled by some device or circuit parameter. The amplitude and phase of the harmonics contained in these waveshapes are determined by fourier analysis for various firing angles. Employing the first four harmonics the waveshapes are graphically reconstructed so that agreement with the idealized waveshape can be determined. This is an attempt to represent mathematically these complex waveforms for use in device performance analysis. (Author)

PB 181 183 $3.50

Naval Research Lab., Washington, D. C.
DIRECT ENERGY CONVERSION LITERATURE ABSTRACTS. Rept. no. 3, Abstracts 1629-2825. Apr 62, 234p. 1265 refs.

DESCRIPTORS: *Power supplies, *Energy, *Bibliography, *Thermoelectricity, *Fuel cells, *Thermionic emission, *Photoelectric cells, Electrochemistry, Primary batteries, Storage batteries, Solar energy, Nuclear energy, Magnetohydrodynamics, *Solar cells, Materials, Alloys, Design, Generators, Indexes, Semiconductors, Silicon.

(See also AD-269 892)

PB 159 880 $1.10

Navy Electronics Lab., San Diego, Calif.
SCOPE PRESENTATION ARRAY COMPENSATOR, by F. R. Abbott. 27 Apr 55, 9p. 1 ref. Development rept. 582.

DESCRIPTORS: *Sonar, *Display systems, Hydrophones, Underwater communication systems, Signal-to-noise ratio.

A typewriter-size equipment which converts distant signals picked up by a receiving array into a coherent, polar-oriented display on a scope has been developed. The device utilizes synchro resolvers to represent the time phase of each incoming signal as polar angle. The individual signals, thus converted, are then added and appear as an elliptical ring. By use of high-Q components, no significant signal is lost and no preamplification required. This device, which represents a tremendous space and weight reduction from present refrigerator-size equipments, yields bearing information and, in addition, presents a striking portrayal of a distant signal in sharp contrast to locally generated self-noise. (Author)

PB 158 837 $5.60

Pacific Semiconductors, Inc., Culver City, Calif.
TRANSISTOR, JUNCTION, DIFFUSED BASE, R. F. POWER OSCILLATOR, by S. H. Barnes, L. D. Brown and others. Quarterly progress rept. no. 3, 31 Dec 58-31 Mar 59, on Contract DA 36-039-sc-78033. [1959] 52p. 3 refs. AD-218 660

DESCRIPTORS: *Transistors, Design, *Radiofrequency oscillators, Circuits.

Development of a ruled mesa, metallized structure yielding high output power at low collector voltages is described, as is the new package. Programs aimed at attaining high reliability and characteristics stability are described. Production Engineering of processes, preliminary to launching the Engineering Test Model transistors fabrication run. Characteristics of transistors evaluated during this period are described and analyzed, and related to oscillator and amplifier performance. The reliability evaluation program is described. (Author) (See also PB 144 156)

PB 158 836 $5.60

Philco Corp., Philadelphia, Pa.
RESEARCH AND EXPERIMENTAL WORK ON MICROWAVE TRANSISTORS, by R. L. Goldman, J. P. Spratt and others. Quarterly progress rept. no. 7, 15 July-15 Oct 59, on Contract DA 36-039-sc-74988. [1959] 60p. 9 refs. Philco no. H-2153-7; AD-231 419.

DESCRIPTORS: *Transistors, *Semiconductors, *Microwave equipment, Design, *Silicon, *Diodes, Microwave oscillators, *Germanium, *Oscillators.

A detailed study was made of the DC characteristics of avalanche transistors. The aim of this study was to provide a better knowledge of the mechanism so that the high-frequency capabilities could be improved. The AC equivalent circuit was also investigated in an attempt to find the origin of the anomalously large RC times of the device when squegging. Studies of Esaki diodes fabricated from arsenic doped n-type germanium have been continued. Junctions formed by alloying through the blank give significantly higher values of the peak-to-valley ratio. A study also was made of the excess current phenomenon. Measurements of maximum frequency of oscillation have been taken. Preliminary design and fabrication work has started on a low inductance (higher f_{MAX}) package. A detailed theoretical

analysis of the device possibilities of a microwave Hall oscillator has been made; the results suggest that a microwave analogue of the low-frequency Hall device may be possible. A study was also made of the possibility of using magnetoresistive effects to obtain microwave amplification. The relative advantages of the Hall and magnetoresistive amplifiers were compared. An experimental Hall amplifier was built. (Author) (See also PB 146 489)

PB 158 173 $3.60

Radio Corp. of America, Camden, N. J.
INTERCOMMUNICATION SET AN/AIC-12. Final rept. 1 July 58-30 Nov 60, Contract DA 36-039-sc-66496, continuation of Contract DA 36-039-sc-63205. [1960] 34p.; AD-249 238.

DESCRIPTORS: *Intercommunication systems, Airborne, Design, Transistors, Helicopters, Installation, Military aircraft.

Final research is reported on the development and construction of Intercommunication Sets C-1611(XC-3)/AIC-12 and C-1611(XC-4)/AIC-12. Also included are a description of an engineering test installation of an AIC-12 system in an H-19 helicopter and a service test installation in an H-21 helicopter.

TID-14985 $1.60

Rauland Corp., Chicago, Ill.
PROGRESS REPORT ON IMAGE INTENSIFIER, by Wilfrid F. Niklas. Rept. on Contract AT(11-1)-1058. 25 Jan 62, 20p.

AD-270 131 repriced $3.00

RCA Defense Electronic Products, Princeton, N. J.
SOLAR CELL ARRAY OPTIMIZATION, by R. R. Addiss, A. Anchutin and others. Rept. for July 60-Mar 61, on Research and Development Program Involving Solar Cell Array Optimization, Contract AF 33(616)7415. Nov 61, 159p. 279 refs. ASD Technical rept. 61-11.

DESCRIPTORS: *Solar cells, Photoelectric cells, Materials, Single crystals, Cadmium compounds, Sulfides, Reliability, Adhesives, Coatings, Airborne, Plastics, *Electric power production, Power supplies, Airborne.

Preliminary specifications are given for two optimized solar-cell-array systems. The primary optimization criterion applied was to obtain the maximum electrical power conversion of solar energy in space per unit of system weight, consistent with required minimum reliability and maximum permissible packaged volume. Specific areas considered are, photovoltaic materials, crystal conversion, solar cell circuit simulation, array interconnection optimization, adhesives, array structures, foam inflation, thermal design, temperature and intensity effects, and launch environment. (Author)

SCTM-10-62(24) $0.50

Sandia Corp., Albuquerque, N. Mex.
A COAXIAL REFLECTOMETER SYSTEM, by W. E. Little and R. L. Kasparek. Feb 62, 16p. 3 refs.

PB 152 060 $18.50

Stanford Electronics Labs., Stanford U., Calif.
INFORMATION HANDLING AND PROCESSING IN LARGE COMMUNICATION SYSTEMS, by W. F. Luebbert. Rept. on Contract Nonr-225(24). 11 July 60, 291p. 9 refs. Technical rept. no. 009-1; AD-243 676.

DESCRIPTORS: *Communication systems, *Data transmission systems, Computers, *Data processing systems.

The information handling and processing activities of large communications systems are studied. It is demonstrated that communications systems can be viewed as information processing systems with rather different characteristics from conventional one-location data processors, and that both communications and conventional systems can be viewed as special cases of a more general type of system. Von Neumann's concept of interchangeability of program and data in computers can be extended to interchangeability of system and user information in communications systems. The result would be entirely new dimensions for planning and techniques for overcoming some of the most severe limitations of current communications systems. (Author)

PB 158 266 $7.60

Stanford Research Inst., Menlo Park, Calif.
STUDY OF EFFECTS AND CONTROL OF SURFACE CONTAMINANTS ON ELECTRICAL MATERIALS, by Saul W. Chaikin. Semiannual technical rept. no. 1, 15 Feb-15 Sep 60, on Contract DA 36-039-sc-85274. 15 Sep 60, 77p. 1 ref. Rept. no. 3; SRI Proj. no. SU-3145; AD-246 647.

DESCRIPTORS: *Electrical equipment, *Sliding contacts, Exposure, Contamination, *Palladium, *Gold, *Electron microscopy, Vapors, Deposits, Hydrocarbons, Resistance, Surfaces, Electronic equipment.

Subtle causes of contact contamination are given continued study. Organic contact contamination was reproduced in the laboratory under controlled conditions. Insulating films from organic vapors were shown to form spontaneously on clean palladium and gold. Detection by the Probe Instrument and by the electron microscope showed that palladium was much more reactive than gold. Studies on frictional polymer with the electron microscope also showed some activity by gold and, of course, high activity by palladium. (Author)

PB 159 849 $4.60

Surprenant Mfg. Co., Boston, Mass.
HIGH TEMPERATURE PULSE CABLES, by D. C. Alexander and E. W. Bennett, Jr. Rept. on Improved Electronic Components, Contract AF 33(616)6279. July 60, 44p. 4 refs. WADD Technical rept. 60-474; AD-249 406.

DESCRIPTORS: *Pulse cables, *Insulating materials, Dielectrics, Silicones, Plastics, Polymers, Ethylenes, Fluorocarbons, Shielding, Coaxial cables, *Electronic equipment, Airborne, Attenuation, Effectiveness, Thermal insulation.

The development of a high temperature (150 C) pulse cable utilizing silicone rubber as the dielectric and the jacket material is described. The methods developed for improving corona level of this cable are discussed. The development of a second high temperature (150 C) pulse cable utilizing cross-linked polyethylene as the dielectric material and a fluorocarbon polymer as the jacket material is described. A method of improving the shielding effectiveness factor of these cables is given together with test methods and data covering the variation of shielding effectiveness factor with frequency. Cables were developed which met or exceeded design requirements with the exception of corona extinction values. These values were, however, in excess of those expected of the associated connectors for these cables. (Author)

PB 156 663 $2.60

Union Thermoelectric Div., Comptometer Corp., Niles, Ill.
ULTRAMINIATURE QUARTZ CRYSTAL UNITS, by Roger E. Bennett and John Deininger. Quarterly progress rept. no. 2, 15 Sep-14 Dec 60, on Contract DA 36-039-sc-85348. [1960] 23p. 1 ref; AD-252 626.

DESCRIPTORS: *Quartz resonators, *Quartz crystals, *Subminiature electronic equipment, Electronic equipment, Design, Electrodes, Impedance, Electrical properties, Crystal holders, Production, Miniature electronic equipment, Manufacturing methods, Harmonic oscillators.

Results of an experiment involving 15 mc quartz resonators, the frequency being arrived at on the fundamental, and on the 3rd, 5th, and 7th overtones are given. Various electrode sizes were used on each order. Experimental units with diameters down to 0.090 in. have been successful. Fabrication techniques and measuring problems are discussed. It is highly desirable that the apparent rapid degeneration of Q on the fundamental and all overtone orders where very small electrodes are employed be proved or disproved. Fabrication of plain-parallel plates of very small dimensions presents less difficulty than encapsulation and measurements of the electrical parameters. (Author)

PB 157 770 $2.60

Watkins-Johnson Co., Palo Alto, Calif.
DEVELOPMENT OF S-BAND VERY-LOW NOISE TRAVELING-WAVE AMPLIFIER, by B. P. Israelsen. Quarterly progress rept. no. 1, 1 Jan-31 Mar 61, on Contract DA 36-039-sc-87396. 13 Apr 61, 25p. 2 refs. File no. W-J 61-334K3.

DESCRIPTORS: *Traveling wave tubes, *Microwave amplifiers, Electron tubes, Amplifiers, S-band, Magnets, Helixes, Vibration, Tests, Theory, Noise (Radio), Reduction, Cooling, Focusing, Magnetic fields, Design, Transducers.

The results of vibration tests performed on the WJ-211 S-band low-noise tube are described, as well as measures taken to achieve ruggedization in the helix and gun structures. The methods used to ruggedize the helix include glazing and expanding to form a tight fit in the glass envelope. An experiment is discussed wherein an operating tube was cooled to liquid nitrogen temperature and the resulting decrease in noise figure observed. Two mechanisms are postulated whereby the reduced temperature improves noise figure. A preliminary permanent magnet design is described briefly. (Author)

Ordnance, Missiles, and Satellite Vehicles

PB 181 187 $0.50

Naval Ordnance Lab., White Oak, Md.
COMMENTS ON THE TEMPERATURE COEFFICIENT OF RESISTANCE AS USED IN WIRE BRIDGE ELECTRO-EXPLOSIVE DEVICE ANALYSES, by J. N. Ayres. 1 Nov 61, 13p. 3 refs. NOLTR 61-154.

DESCRIPTORS: *Electric detonators, *Electric igniters, *Electric bridges, Electric wire, Wire, Temperature, Resistance, Errors, Electromagnetic waves, Hazards, Ordnance.

The resistance of an electro-explosive device (EED) at some temperature elevation, Θ, above ambient can be expressed by $R = R_O (1 + \alpha\Theta)$, where R_O is the resistance at ambient temperature, and α is the temperature coefficient of resistance. This equation is not consistent with the hand-book definitions of temperature resistance coefficient wherein the parameters R_O and α are referenced to 0°C conditions rather than ambient temperature conditions. Misuse of the numerical values can lead in some cases to significant computational errors. The source, magnitude, and correction of these errors is presented. Also the mathematical basis for an efficient test plan for the determination of α, R_O, and γ is given. (Author)

PB 181 188 $0.75

Naval Ordnance Lab., White Oak, Md.
ENERGY REQUIREMENTS FOR THE INITIATION OF WIRE AND CARBON BRIDGE PRIMERS CONNECTED ELECTRICALLY IN PARALLEL OR SERIES, by E. Eugene Kilmer. 22 Nov 61, 25p. 4 refs. NOLTR 61-171.

DESCRIPTORS: *Electric igniters, Electric detonators, Electric wire, Wire, Carbon, Electric bridges, *Electric primers, Primers, Ignition, Energy.

In order to gain information about explosive train reliability, carbon bridge and wire bridge primer ignition assemblies were tested in parallel and in series by capacitor discharge. In addition, wire bridge assemblies were tested in parallel and in series by constant current. About twice as much energy was required to fire two carbon bridge assemblies as to fire a single one. It required 2.6 times as much energy by capacitor discharge to fire two wire bridge assemblies as to fire one. Under constant current conditions, two wire bridge ignition assemblies in series required the same current as a single unit but for two in parallel more than twice the current was needed than for a single unit. (Author)

AD-272 424 repriced $2.25

Naval Ordnance Lab., White Oak, Md.
EXPLOSIVES, PROPELLANTS AND PYROTECHNIC SAFETY COVERING LABORATORY, PILOT PLANT, AND PRODUCTION OPERATIONS, by Russell McGill. 20 Oct 61, 99p. 174 refs. NOLTR-61-138.

DESCRIPTORS: Ordnance laboratories, Industrial plants, *Explosives, *Propellants, *Pyrotechnics, Military chemicals, Chemicals, Handling, Production, Loading, Storage, Hazards, Safety, *Instruction manuals, Protective clothing, Toxicity, Oxidizers, Reagents.

Precautions, admonitions, warnings, and instructions for the safe performance of laboratory experiments, operation of semi-works, and first stage production in plants are given in this report. It may be used as a safety manual in connection with any or all of the actions mentioned. Alternatively, it may be used as the basic text for use in writing a safety manual for a specific establishment wherein high energy chemicals and compositions are manipulated. (Author)

AD-271 468 repriced $0.75

Naval Ordnance Lab., White Oak, Md.
THE SCALING OF UNDERWATER EXPLOSION PHENOMENA, by Hans G. Snay. 30 June 61, 22p. NOLTR 61-46.

DESCRIPTORS: *Underwater explosions, Explosions, Model tests, Gravity, Surface tension, Vapor pressure, Viscosity, Explosion bubbles, Simulation, Acceleration, Tests.

The objective of this oral presentation was to summarize the problems and the semantics of scaling in a concise form without use of mathematical developments. The well known cube-root scaling is shown to be a consequence of Mach's similitude, the fourth-root scaling, of Froude's similitude. Requirements which must be satisfied for each of these scaling rules are discussed. Scaling of gravitational effects on underwater explosions (bubble behavior) is not possible by means of model tests conducted in a river or a pond, but requires test tanks in which the air pressure above the water can be reduced or the acceleration of gravity increased. The scaling of surface tension, vapor pressure, and viscosity are discussed. Model tests on damage to targets are not considered. A short discussion on the concept of approximate scaling is included. (Author)

AD-272 578 repriced $1.00

Naval Ordnance Lab., White Oak, Md.
UNDERWATER SHOCK WAVE FREQUENCY SPECTRUM ANALYSIS. I. SIMPLE WAVEFORMS APPROXIMATING MEASURED PRESSURE PULSES IN WATER, by John P. Slifko. 14 July 61, 34p. 12 refs. NOLTR 61-94.

DESCRIPTORS: *Underwater explosions, Explosions, *Underwater sound transmission, *Shock waves, Pressure, Refraction, Reflection, Frequency, Wave analysis, Fourier analysis, Integrals, Pulse analyzers.

A Fourier integral analysis is presented for simple waveforms approximating the more common underwater shockwave pulses; the waveforms treated are the exponential, exponential modified by the recorder frequency characteristics, exponential modified by reflection and cutoff, triangular, and square. A cosine pulse, such as it emitted by sonar transducers, is also shown for comparison. Analytical expressions for the amplitude spectra are summarized and the frequency composition is shown graphically in non-dimensional form for most of the functions. Some of the experimental conditions and recorder characteristics which may produce the various waveforms are noted. The effect upon the frequency composition of the superposition of identical pulses displaced by equal time increments is also discussed. These spectrum analysis, although approximate, permit a better understanding of the relationship between the frequency spectra and the waveforms of underwater shockwaves. (Author)

PB 159 866 $13.50

Naval [Propellant] Plant, Indian Head, Md.
MANUAL FOR AMMUNITION QUALITY EVALUATION SURVEILLANCE LABORATORIES, by S. G. Cook, J. M. Rosen, and C. N. Bernstein. 1946, reprinted 24 Feb 54, 193p. 10 refs. Memo. rept. no. 79; AD-35 000.

DESCRIPTORS: *Ammunition, Quality control, Test methods, Instruction manuals.

The manual contains a detailed description of 17 different general tests which may be useful for the quality evaluation of explosives. Since the manual was prepared, some methods may have been improved, the sources of supply may no longer be accurate, and the NPF may no longer be able to supply the assistance suggested in the manual.

PB 181 185 $0.50

Springfield Armory, Mass.
EXPERIMENTAL HEAT RESISTANCE TESTS ON FIBER-GLASS REINFORCED PLASTIC HANDGUARDS FOR THE M14 RIFLE, by K. A. Jorczak. Rept. on Development of FRP Stocks and Handguards for the 7.62mm, M14 Rifle. 6 Nov 61, 11p. Rept. no. SA-TR11-2629.

DESCRIPTORS: *Small arms, Materials, *Glass textiles, Textiles, *Plastics, Heat tolerance, Tests, Gunstocks.

An investigation was made to obtain data concerning the heat resistance of the M14 fiber glass reinforced plastic handguards. These handguards had various modifications of the inner surface. Test procedure is described, and results discussed. Handguards with fiber glass reinforced plastic polyester construction are superior to wood with regard to heat resistance. No difference was shown in the heat resistance of the various polyester type fiber glass reinforced plastic constructions tested. It was recommended that further investigation be made to improve the heat resistance of the M14 fiber glass reinforced plastic handguard. (Author)

MACHINERY, FABRICATION, AND ACCESSORY EQUIPMENT

ANL-6483 $1.00

Argonne National Lab., Ill.
SOME ASPECTS OF THE APPLICATION OF NUCLEAR ENERGY TO SMALL PORTABLE AND AUTOMOTIVE POWER SUPPLIES, by D. R. MacFarlane. Rept. on Contract W-31-109-eng-38. Feb 62, 38p. 22 refs.

PB 161 637 $1.25

National Bureau of Standards, Washington, D. C.
SOME PROBLEMS OF FATIGUE OF BOLTS AND BOLTED JOINTS IN AIRCRAFT APPLICATIONS, by Leonard Mordfin. Jan 62, 55p. 82 refs. Technical note no. 136; BuWeps Proj. TED NBS RAAD-23-001.

DESCRIPTORS: *Bolts, *Bolted joints, *Fatigue (Mechanics), Stresses, Aircraft, Structures, Airplane engines.

The profuse variety of aircraft bolts which is available has made the evaluation and specification of bolts for engine and structural use extremely complex, particularly insofar as fatigue and hot fatigue environments are concerned. The state of knowledge of fatigue of bolts and bolted joints is surveyed and critically appraised in terms of aeronautical practices. Using this material as a basis, recommendations are made regarding the evaluation and specification of aircraft bolts for fatigue situations and regarding the growing problem of errors in fastener replacement. (Author)

AD-272 601 $7.60

Boeing Co., Seattle, Wash.
STANDARIZED UNIVERSAL TOOLING PROGRAM. APPLICATIONS ENGINEERING REPORT, by W. Ahnert, D. Eklund, and D. Kelleher. Rept. for 5 July 60-11 Oct 61, on Contract AF 33(600)41845. 11 Oct 61, 74p. 12 refs. ASD Technical rept. 61-7-829 (I); AD-246 956.

DESCRIPTORS: *Tools, Standardization, *Industrial equipment, *Jigs, Handling, Storage, Transportation, Aircraft, Guided missiles, Hoists, Design

This report covers the description, selection and application of : jig frames; trunnion shafts; trunnion bearing; trunnion stands; gear drive assembly; counterbalance; indexing equipment; storage equipment; transportation equipment; and hoisting equipment.

AD-272 600 $11.50

Boeing Co. [Seattle, Wash.].
STANDARDIZED UNIVERSAL TOOLING PROGRAM, by W. Ahnert, D. Eklund, and D. Kelleher. Final technical engineering rept. for 5 July 60-11 Oct 61, on Contract AF 33(600)41845. 11 Oct 61, 153p. 12 refs. ASD Technical rept. 61-7-829.

DESCRIPTORS: *Tools, Standardization, *Jigs, *Industrial equipment, Design, Handling, Storage, Transportation, Aircraft, Guided missiles, Hoists, Airframes, Aircraft industry, Industrial production, Instruction manuals, Specifications

This program covers the completed effort for the selection of types and sizes, design and documentation of a Standardized Universal Tooling System for use by the missile and aircraft industry. The system includes a series of incrementally sized rectangular and round jig frames and their related trunnion mounting, storage transportation, and hoisting equipment. It also includes general purpose hoisting equipment.

PB 159 481 $1.10

Navy Electronics Lab., San Diego, Calif.
THE BNC SOLDERING DEVICE, by J. C. Hanselman. 16 Nov 60, 9p. Rept. 1012; AD-254 549.

DESCRIPTORS: *Coaxial cables, *Electric connectors, *Soldering, Tests.

A special soldering tool was devised for BNC and Type N coaxial cable connections. It reduces the time needed to solder BNC connections, achieves a higher reliability, and avoids damage to connectors. (Author)

DC-60-3-244 $2.60

General Electric Co., Cincinnati, Ohio
COMBINED RADIATION TEMPERATURE EFFECTS ON SILICONE RUBBERS AND TEFLON, MILESTONE 51444-5, by C. G. Collins. Rept. on Contract AT(11-1)-171. 3 Mar 60, 28p.

DC-60-2-112 . $1.60

General Electric Co., Cincinnati, Ohio.
TESTING OF 304 STAINLESS STEEL METAL BOSS SEALS, by J. S. Fitts, Jr. Rept. on Contract AT(11-1)-171. 9 Feb 60, 18p.

AD-271 457 repriced $0.50

Rock Island Arsenal Lab., Ill.
CONVERSION COATING FOR CHROMIUM, by R . H. Wolff. 4 Dec 61, 18p. 11 refs. Rept. no. 61-4360.

DESCRIPTORS: *Chromium, *Coatings, *Chromium plating, Oxides, Films, Corrosion inhibition, Electrolysis, Electrolytes, Electrodeposition, Chemicals, Water, Anodes, Cathodes, Electrodes, Tests

Selected chemicals in water solution were used electrolytically in an effort to produce an oxide conversion coating upon electrodeposited chromium. Some materials and solution combinations produced thin, colored, iridescent films at the anode or cathode and sometimes at both electrodes. Cr_2O_3 films were obtained in what appears to be the hydrous form at the anode. Such films could be produced as relatively thick gels. Unfortunately, these gels have no bond to the basis Cr and upon removal from solution, dry to a loosely adherent powder. No satisfactory method was found for producing Cr_2O_3 supplementary coatings on Cr surfaces using aqueous solution techniques. (Author)

AD-273 841 $0.50

Rock Island Arsenal Lab., Ill.
DEVELOPMENT AND EVALUATION OF NEW CROSS LINKING AGENTS FOR ELASTOMERS, by F. B. Testroet and C. O. Crozier. 9 Jan 62, 15p. Rept. no. 62-131.

DESCRIPTORS: Carboxylic acids, Acids, Butadienes, Dienes, Acrylonitriles, Urethanes, *Elastomers, Vulcanizates, Physical properties, Aging, Tests, Epoxy resins, Phenol formaldehyde resins, Resins, Metallic compounds, Oxides, Boron, Boron compounds, Phosphites, Titanates, Effectiveness.

A screening program was undertaken to evaluate reactive polyfunctional chemicals, e.g., epoxy resins, phenol formaldehyde resins, metal oxides and compounds containing boron, phosphorous or silicon, as potential crosslinking agents for carboxylic, butadiene/acrylonitrile and urethane elastomers. The objective of this program was to develop new crosslinking systems capable of providing elastomeric vulcanizates with improved properties at high and low temperatures and increased resistance to the degradative effects of fluid immersion and natural aging. Although most of the vulcanizates, which were produced with experimental crosslinking agents, failed to display stress-strain properties comparable to those of the control vulcanizates which employed conventional crosslinking agents, many promising new curing systems worthy of further investigation were discovered. Some of the more noteworthy crosslinking agents were elemental boron, boron compounds, triphenyl phosphite and tetra isopropyl titanate. (Author)

PB 181 191 $0.75

Rock Island Arsenal Lab., Ill.
DEVELOPMENT OF GREASES FOR BROAD TEMPERATURE RANGE, by Max T. Fisher. 4 Dec 61, 24p. 6 refs. Rept. no. 61-4358.

DESCRIPTORS: *Greases, Physical properties, Tests, Stability, Lubrication, Temperature.

Attempts to prevent thickener agglomeration at high temperatures included the reduction of free surface energy by thickener impregnation with phenolic resins, pentaerythritol and mercuric iodide, substituting less volatile coupling agents for water, the synthesis of an unsymmetrical organic compound to inhibit crystal growth and the attempted inducement of cross-linkage of the organic thickaners. These methods were less than adequate for the greases investigated. The reaction of pyromellitic acid with various aromatic amines resulted in a product with melamine having the required high melting point and sufficient thickening efficiency to produce a grease with phenylmethyl polysiloxane at 30-40% concentrations. This grease was also lacking in shear stability after heating at 500°F. No satisfactory high temperature structural stabilizer was found. (Author)

Ceramics and Refractories

NYO-9586 $1.25

Aeroprojects, Inc., West Chester, Pa.
APPLICATIONS OF ULTRASONIC ENERGY. ULTRASONIC CASTING OF CERAMIC AND CERMET SLIPS, by C. Dana McKinney, Jr., William B. Tarpley, and Frederick H. Gaskins. Rept. on Contract AT(30-1)-1836. Nov 61, 47p. 12 refs.

AD-257 732 repriced $3.50

Bell Aerosystems Co., Buffalo, N. Y.
INVESTIGATION OF FEASIBILITY OF UTILIZING AVAILABLE HEAT RESISTANT MATERIALS FOR HYPERSONIC LEADING EDGE APPLICATIONS. VOLUME VII. OXIDATION RESISTANCE OF BARE AND COATED MOLYBDENUM ALLOY AND GRAPHITE, by Donald J. Powers, John A. Dickson and others. Rept. for July 58-July 60, on Ceramic and Cermet Materials, Contract AF 33(616)6034. Dec 60, 208p. 4 refs. WADC Technical rept. 59-744, Volume VII.

DESCRIPTORS: Refractory materials, Heat resistant alloys, *Hypervelocity vehicles, Hypersonics, High temperature research, *Molybdenum alloys, Titanium alloys, *Graphite, Coatings, Oxidation, Silicon coatings, *Refractory coatings, Ceramic materials, *Wings, Design, Tests, Test facilities, Test methods, Gliders, Materials, Aerodynamic heating, Plasma jets, Heating, Ceramic coatings.

Results are presented of oxidation resistance tests of bare and coated 0.5% Ti alloy of Mo and ATJ graphite. Chromalloy W-2 and Durak MG coatings were evaluated on the Mo alloy while the ATJ graphite was coated by the National Carbon Company's siliconizing process. Tests were conducted in 5 different facilities including 3 arc plasma jets at temperatures from 2000 to 3400F and times from 1 min to 4 hr. Both uncoated materials reacted exothermically under oxidizing conditions. A high degree of failures were encountered on all coated specimens. (Author) (See also AD-257 731)

DC-60-2-212 $2.60

General Electric Co., Cincinnati, Ohio.
CAMBER STUDY OF EXTRUDED TUBES, by C. L. Brown and T. A. Mroz. Rept. on Contract AT(11-1)-171. 22 Feb 60, 30p.

DC-60-4-80 $1.10

General Electric Co., Cincinnati, Ohio.
COMPILATION OF PROPERTIES OF BERYLLIUM INTERMETALLIC COMPOUNDS, by G. C. Huth and J. P. Smith. Rept. on Contract AT(11-1)-171. 7 June 60, 18p.

PB 159 868 $2.60

General Electric Co., Cincinnati, Ohio.
THE EFFECT OF ARC PLASMA DEPOSITION ON THE STABILITY OF NON-METALLIC MATERIALS, by B. E. Kramer and M. A. Levinstein. Bi-monthly rept. no. 5, Nov-Dec 60, on Contract NOas 60-6076-c. 3 Feb 61, 23p. 3 refs. Rept. no. DM 61-46; AD-252 805.

DESCRIPTORS: *Flame spraying, *Plasma jets, *Refractory materials, Nozzles, Oxides, Carbides, Nitrides, Coatings, Refractory coatings, *Ceramic materials, Ceramic coatings, Deposits, Chromium compounds, Aluminum compounds, Zirconium compounds, Hafnium compounds, Stability.

Plasma flame spraying studies were conducted using three different types of plasma jet spray nozzles. The materials sprayed included high melting point oxides, carbides, and nitrides. Photomicrographs are shown for all materials. (Author) (See also PB 155 937)

DC-60-3-35 $3.60

General Electric Co., Cincinnati, Ohio.
MILESTONE REPORT ON HYDROGEN PERMEATION OF OXIDIZED METALS AND ALLOYS, JOB 53292, by R. M. Haag. Rept. on Contract AT(11-1)-171. 2 Feb 60, 36p.

DC-60-2-84 $1.60

General Electric Co., Cincinnati, Ohio.
PREDICTED RADIAL TEMPERATURE DISTRIBUTIONS FROM TRANSIENT TEMPERATURE MEASUREMENTS IN A HOLLOW BeO CYLINDER, by J. E. Stankevicz and R. N. Noyes. Rept. on Contract AT(11-1)-171. 3 Feb 60, 15p.

DC-55-6-101 $2.60

General Electric Co., Cincinnati, Ohio.
SURVEY AND EVALUATION REPORT ON RADIATION DAMAGE TO CERAMIC MATERIALS, by C. G. Collins, W. J. Stapp, and V. P. Calkins. Rept. on Contract AT(11-1)-171. 16 June 55, declassified. 24p.

AD-270 536 repriced $1.25

National Carbon Co., Inc., Cleveland, Ohio.
RESEARCH AND DEVELOPMENT ON ADVANCED GRAPHITE MATERIALS. VOLUME V. ANALYSIS OF CREEP AND RECOVERY CURVES FOR ATJ GRAPHITE, by E. J. Seldin and R. N. Draper. Rept. on Refractory Inorganic Non-Metallic Materials, Contract AF 33(616)6915. Sep 61, 46p. 10 refs. WADD TR-61-72, vol. 5.

DESCRIPTORS: *Graphite, *Creep, Deformation, Elasticity, Viscosity, Stresses, Mathematical analysis, Theory, High temperature research.

Flexural creep tests were made on specimens of ATJ graphite at temperatures ranging from 2300 to 3000 C. The creep curves were fitted by graphical and analytical means to 4 equations. Of the 4 equations, one could be related to simple rheological models having some physical significance. A model was useful not only in describing the creep curves, but also in describing the recovery after creep and relating the behavior in recovery to the behavior during creep. Generally good agreement was found between the qualitative predictions of the models and the observed behavior. Using a model, an activation energy for the steady state creep rate was determined to lie between 70 and 76 kcal/mole. Some deviations were detected between the actual behavior of the material and that predicted by the simple models. (Author)

PB 159 806 $3.60

Norton Co., Worcester, Mass.
HOT-PRESSED CERAMIC BODIES, by G. R. Finlay. Final summary rept. on Contract NOa(s)-9471. 7 Oct 52, 33p. AD-9957.

DESCRIPTORS: Jet engines, *Gas turbine blades, Turbine blades, *Ceramic materials, *Refractory materials, Processing, Mechanical properties, Temperature, Sintering, Casting, Impregnation.

Studies were made of refractory materials suitable for use in turbines of jet engines, especially for turbine blades. These materials must withstand thermal

shock, must have a modulus of rupture of at least 20,000 psi, and must withstand mechanical and chemical erosion. These requirements must be met in the 1800° to 2400°F temperature range. The 7 materials found suitable were C-Ti mixed boride, Ti boride, Mo boride, Zr boride, high-C TiC, metal impregnated SiC and Mo silicide. Hot-pressed ZrC withstood the thermal shock test at 2300°F but showed poor resistance to oxidation. Normal TiC passed the thermal shock test at 1800°F but failed at higher temperatures CrB_2 failed in thermal shock, but CrB gave good results. Most specimens were made by hot-pressing in graphite molds at temperatures of 1450° to 2250°C (depending upon refractory characteristics of the material) and pressures around 2500 psi. Specimens were made in various shapes for different tests including rectangular bars for cross-bending strength tests at room temperature and at elevated temperatures, disks 2 in. in diam and 1/4 in. thick (as molded) for heat-shock tests, tensile specimens designed for stress-rupture and creep tests, and turbine blade specimens of rough Westinghouse shape. Hot-pressing was the most satisfactory method for fabricating the materials discussed. Slip-casting followed by sintering and impregnating was another promising method.

Plastics

AD-259 514 $3.60

Material Lab., New York Naval Shipyard, Brooklyn, N. Y.
ON THE CHARACTERISTICS OF RIGID POLYURETHANE FOAM FOR THERMAL INSULATION APPLICATION, by M. Silvergleit and I. Resnick. Rept. of Research. 29 June 61, 34p. 4 refs. Lab. Project 6191, Progress rept. 1.

DESCRIPTORS: *Expanded plastics, *Urethanes, *Heat resistant polymers, Esters, Ethers, Resins, Plastics, *Thermal insulation, *Insulating materials, Physical properties, Mechanical properties, Density, Combustion, Stability, High temperature research, Low temperature research, Molding materials, Fluorocarbons, Pipes, Ships, Tests, *Polymers, Thermal conductivity.

Polyurethane foams, with nominal densities of 2 lbs per cubic foot, have been investigated to determine their utility for shipboard thermal insulation applications. Based on a consideration of important characteristics for such materials, pertinent physical and thermal properties were determined, in order to obtain information for the establishment of performance requirements for procurement purposes. The fluorocarbon blown foam materials had a thermal conductivity (K factor) of approximately 0.14 Btu-in./hr-ft^2-°F; this value, indicating superior thermal insulating properties, was much lower than that found in other foamed plastics and other insulating materials used in thermal insulation applications. Rigid urethane foam for insulation applications is available in molded shapes, such as pipe coverings, and is also available for foamed in-place applications. These materials are also available in both the fire retardant and the non-fire retardant grades. (Author)

PB 181 176 $1.25

Plastics Lab., Princeton U., N. J.
CARBON BLACK DISPERSIONS IN THE ELASTIC MELT EXTRUDER, by David E. Noffsinger and Bryce Maxwell. Rept. on Contract DA 36-039-sc-78105. 30 Dec 60, 41p. 12 refs. Technical rept. no. 60B; AD-251 518.

DESCRIPTORS: *Plastics, *Carbon black, Extrusion, Mixtures, Processing, Diffusion, Manufacturing methods, Ethylenes, Pigments, Microanalysis.

Dry blends of carbon black and low density polyethylene were intensively mixed in the elastic melt extruder under various conditions. The variables of rotor speed, gap distance, type of carbon black used, concentration and relative particle size of dry blend components were investigated. Gap distance and relative concentration of the dry blend components in the charge were the most important factors in determining the quantity of mixing action that was obtained A small gap distance and high concentration of discontinous phase components (carbon black) gave the best mixing results. Rotor speed and relative particle size of dry blend components had an influence on the mixing action to a limited extent. The type of carbon used as the discontinuous phase was found to be important. A nearly perfect dispersion of carbon black in the polyethylene phase was obtained at conditions indicated by the studies to be approaching the optimum levels. (Author)

Wood and Paper

PB 159 877 $2.60

Material Lab., New York Naval Shipyard, Brooklyn.
INVESTIGATION OF THE MECHANICAL AND PHYSICAL PROPERTIES OF KOKRODUA, AFRORMOSIA ELATA, HARMS, IN THE GREEN AND AIR-DRY CONDITION OF MOISTURE, by C. P. Cologer. Progress rept. no. 2 (Final). 1 Aug 59, 24p. 15 refs. Lab. Project 5740-8; AD-230 366.

DESCRIPTORS: *Wood, Physical properties, Mechanical properties, Africa.

A comparison of the mechanical properties of kokrodua with teak and white oak, permit the following conclusions: (1) kokrodua is similar to teak in static bending (in work to maximum load, kokrodua is superior to teak); (2) kokrodua is somewhat better than teak in all other mechanical properties, except for tension perpendicular to grain in which teak surpasses kokrodua, (3) in almost all mechanical properties, kokrodua is above oak but it is lower than oak in toughness and similar to oak in tension perpendicular to grain, (4) in the overall, the mechanical properties of kokrodua are slightly better than those of teak and are markedly superior to those of white oak, (5) the weight per cubic foot of kokrodua at 50% moisture content is slightly above that of teak and white oak, respectively, and (6) kokrodua is greater than teak and less than oak in radial, tangential, longitudinal and volumetric shrinkage . (Author)

PB 181 184 $1.25

Naval Research Lab., Washington, D. C.
NATURAL RESISTANCE OF WOODS TO BIOLOGICAL DETERIORATION IN TROPICAL ENVIRONMENTS. PART I. SCREENING TESTS OF A LARGE NUMBER OF WOOD SPECIES, by C. R. Southwell, C. W. Hummer, Jr. and others. Interim rept. 7 Feb 62, 46p. 25 refs. NRL rept. 5673.

DESCRIPTORS: *Wood, *Resistance, Microorganisms, *Tropical deterioration, Exposure, Deterioration, Marine borers.

In four different tropical environments, heavily infested with wood-destroying organisms, 114 species of scientifically identified woods have been undergoing a screening test for periods up to an 18-month exposure. Results of marine borer resistance studies have revealed 21 woods to be highly resistant to borers in Pacific Ocean water for the first 14 months of exposure. Stake tests in tropical jungle soil on both the Atlantic and Pacific Coasts of Panama showed 26 woods to be very durable to both subterranean termites and fungal decay for the first 18 months of exposure. Each wood included has been assigned resistance ratings of high, moderate, or low in respect to marine borer attack in sea water, teredo attack in brackish water, subterranean termites in tropical soil, and fungal decay in contact with jungle soil.

MATHEMATICS

AD-269 750 $2.00

Armed Services Technical Information Agency, Arlington, Va.
OPERATIONS RESEARCH. AN ASTIA REPORT BIBLIOGRAPHY, by Herman W. Miles. Jan 62, 133p. 775 refs.

DESCRIPTORS: *Operations research, *Games theory, *Linear programming, Management engineering, *Bibliography, Symposia, Logistics.

This bibliography was prepared in response to frequent inquiries concerning operations research and related techniques employed in the solution of management and scientific problems. Citations are included for documents cataloged by ASTIA from 1953 through 1 February 1962. Entries are arranged by subject according to a specific technique or method of operations research, rather than a given application or case study. Subject areas include references pertinent to dynamic programming, games theory, inventory theory, linear programming, mathematical models, replacement theory, simulation techniques, and queuing theory. References concerning management engineering, probability theory, and systems analysis are also included as related techniques. Within each subject area, citations to reports published by Department of Defense contractors are arranged alphabetically by source, contract number, and date references to military reports are grouped by source and title. A section entitled General References, includes citations on the use of computers in solving operations research problems, as well as a list of bibliographies, symposia, foreign reports, and miscellaneous studies. (Author)

DC-59-12-82 $4.60

General Electric Co., Cincinnati, Ohio.
FORTRAN TRAINING MANUAL, by R. A. Pastore. Rept. on Contract AT(11-1)-171. 15 Dec 59, 43p.

PB 157 466 $2.60

Institute of Statistics, U. of North Carolina, Chapel Hill.
EQUALITY OF TWO DISPERSION MATRICES AGAINST ALTERNATIVES OF INTERMEDIATE SPECIFICITY, by S. N. Roy and R. Gnanadesikan (Bell Telephone Labs.) Rept. on Contract AF 49(638)213. Mar 61, 22p. 10 refs. Mimeography series no. 282; AFOSR-894.

DESCRIPTORS: *Statistical distributions, *Statistical tests, *Matrix algebra, Probability.

For two multivariate normal distributions the null hypothesis of equal dispersion matrices is considered against several alternatives of intermediate specificity, and a similar region test of the hypothesis against each alternative is offered. Also, for each case, conservative confidence bounds are sought on one or more parametric functions, interpretable as deviations from the null hypothesis in the direction of the alternatives. (Author)

PB 157 956 $1.60

Minnesota U., Minneapolis.
CLUSTER SETS OF PSEUDO-MEROMORPHIC FUNCTIONS, by D. A. Storvick. Technical note no. on Contract AF 49(638)836. June 61, 16p. 16 refs. AFOSR-935.

DESCRIPTORS: *Functions, Transformations (Mathematics), Conformal mapping, Topology.

PB 156 427 $1.10

Minnesota U. [Minneapolis].
A NOTE ON THE MEAN VALUE PROPERTY, by Adriano Garsia. Technical rept. no. 4 on Contract AF 49(638)857. 15 May 61, 10p. AFOSR-672.

DESCRIPTORS: *Functional analysis, Polynomials, Series, Differential equations, Operators (Mathematics).

An exact bound is found for the dimension of the space of functions satisfying the mean value property with respect to a mass distribution with finite support. (Author)

PB 181 189 $0.50

Naval Ordnance Lab., White Oak, Md.
BOUNDEDNESS OF SOLUTIONS OF A CLASS OF INTEGRO-DIFFERENTIAL EQUATIONS IN SEVERAL DIMENSIONS, by Avron Douglis. 22 Dec 61, 16p. 2 refs. Mathematics Dept. rept. no. M-23; NOLTR 61-185.

DESCRIPTORS: *Integral equations, *Differential equations, Theory, Fluid flow, Magnetohydrodynamics.

A class of linear, integro-differential equations is discussed which includes linearized, time-dependent forms of Boltzmann's equation. Solutions satisfying suitable homogeneous conditions on the boundary of a finite domain in configuration space are shown to depend boundedly on their initial data and thus, in particular, to be uniquely determined by their initial data. (Author)

PB 157 992 $1.60

Northwestern U. [Evanston, Ill.]
ON THE USE OF PARAMETERS IN CONTINUED FRACTION TRANSFORMATIONS, by E. P. Merkes (Marquette U.) Technical note no. 4 on Contract AF 49(638)888. June 61, 18p. 12 refs. AFOSR-1082.

DESCRIPTORS: *Continued fractions, *Transformations (Mathematics), Taylor's series, Complex numbers, Sequences, Moments.

An attempt is made to unify the known results on this problem by presenting a systematic method to introduce certain parameters, which, in turn, facilitate the transformation. In some cases the class of continued fractions for which the transformation is known to be applicable has been enlarged. Applications of the transformations are made in the last section to the Stieltjes and Hausdorff moment problems.

AD-256 522 $3.60

Princeton U., N. J.
THE n-PERSON BARGAINING GAME, by Koichi Miyasawa. [Rept. on Contract Nonr-1858(16)]. 28 Mar 61, 33p. 9 refs. Econometric Research Program research memo. no. 25.

DESCRIPTORS: *Games theory, Operations research.

The purpose of this paper is to develop a more generalized treatment of n-person bargaining games which includes Harsanyi's and Isbell's results in part as special cases.

MECHANICS

PB 181 190 $0.50

Naval Ordnance Lab., White Oak, Md.
FREE VIBRATIONS OF A CIRCULAR PLATE, by Walter P. Reid. 16 Jan 62, 16p. 30 refs. Mathematics Dept. rept. M-24; NOLTR 61-186.

DESCRIPTORS: *Sheets, Metal plates, Vibration, Clamps, Mathematical analysis, Functions.

An expression is derived for the norm of the radial eigen-functions. This is used to determine the displacement of a thin, simply supported, circular plate with no central hole which is released from rest. The displacement is also given for a plate which is clamped at its outer edge. (Author)

PB 159 869 $5.60

Naval Research Lab., Washington, D. C.
SHOCK AND VIBRATION BULLETIN NO. 3. May 47, 57p. NRL rept. no. S-3106

DESCRIPTORS: Symposia, Shock, *Vibration, *Impact shock, Electronic equipment, Mechanical properties, *Test equipment, History, Design, Measurement, Instrumentation.

Contents:
The third symposium:
- The history and development of the high-impact shock-testing machine for lightweight equipment
- Application of the lightweight HI shock machine
- Development of NOL shock and vibration test equipment
- NOL shock and vibration test equipment

The Fourth Symposium
- David Taylor Model Basin shock and vibration equipment

Contributed article
- A device for mechanical test of electronic equipment Savibull

Aerodynamics and Pneumatics

PB 157 640 $8.10

Cornell U. Graduate School of Aeronautical Engineering, Ithaca, N. Y.
ON THE SIMILAR SOLUTIONS OF STRONG BLAST-WAVES AND THEIR APPLICATION TO STEADY HYPERSONIC FLOW, by Eric F. Brocher. Rept. on Contract AF 49(638)544. Apr 61, 85p. 17 refs. AFOSR-580.

DESCRIPTORS: Blast, *Shock waves, *Hypersonic flow, Numerical analysis, Pressure, Wedges, Conical bodies, Hypersonics.

In Chapter I, the exact "constant-energy" solution of strong blast waves is expanded in powers of ε, the density ratio across the shock wave; physical quantities are expressed directly as functions of the similitude parameter λ. The range of validity for the application of this solution to hypersonic flow is then studied as a function of ε. In Chapter II, the general similar solution of the strong blast wave is found in the Newtonian approximation. The results are applied to power-law bodies in hypersonic flow using the equivalence principle. The pressure distribution on slender bodies of arbitrary shape is obtained and agrees with the Newton-Busemann pressure formula. In Chapter III,

higher-order approximations are derived for the cases in which the shock layer is thin. A simple pressure formula is obtained and some of its applications are shown. (Author)

AD-270 465 repriced $2.25

Directorate of Systems Dynamic Analysis, Aeronautical Systems Div., Wright-Patterson AFB, Ohio.
DEVELOPMENT OF NORMALIZED SIX-DEGREE-OF-FREEDOM EQUATIONS FOR ANALOG SIMULATION OF ATMOSPHERIC RE-ENTRY, by Alfred C. Robinson and Corrado R. Poli. Rept. for Apr 60-Apr 61. Nov 61, 73p. 8 refs. ASD TR-61-448.

DESCRIPTORS: *Re-entry vehicles, *Re-entry aerodynamics, Atmosphere entry, Simulation, Analog computers, Digital computers, *Mathematical computer data, Mathematical analysis, Perturbation theory.

The six-degree-of-freedom equations are developed for a rigid body re-entering the earth's atmosphere. These equations are normalized to aid in their systematic study. Their solution by means of both analog and digital computers was demonstrated. The results for specific re-entry conditions are shown together with an analysis of the errors in impact position due to re-entry perturbation sources. For the case of proper time scaling, the results of analog and digital computers compare quite favorably. (Author)

METALLURGY

AD-270 039 repriced $3.00

Boeing Co., Seattle, Wash.
PRESENTATION OF CREEP DATA FOR DESIGN PURPOSES, by M. N. Aarnes and M. M. Tuttle. Rept. for 1 June 60-31 May 61, on Materials Application, Contract AF 33(616)7201. June 61, 185p. 22 refs. ASD Technical rept. 61-216.

DESCRIPTORS: *Titanium alloys, Aluminum alloys, Tin alloys, *Iron alloys, *Nickel alloys, Chromium alloys, Cobalt alloys, *Steel, *Heat resistant alloys, High temperature research, High pressure research, *Creep, Mechanical properties, Deformation, Stresses, Temperature, Mathematical analysis, Tests, Aircraft, Structures, Design, Materials.

This program was conducted to obtain additional creep data, to compare creep data from several sources, and to recommend what values to present and in what form to present creep data for design purposes. Conventional long time creep tests were performed on A-286 at 1200 and 1500 ALLOAT at 800 and 100 and Unimach 2 at 600 and 900 F for purposes of comparing with existing similar data. Conventional creep tests were performed on Rene 41 at 1250, 1400, 1550, 1700, 1850, and 2000 F. Data are presented in the form of activation series equations. Nomographs were derived for each material. Cyclic creep tests were performed on Rene 41, in which both stress and temperature were cycled. Cyclic data were found to be comparable to the constant stress constant tempera ture data. (Author)

TID-14954 $1.10

Denver Research Inst., Colo.
COMPLETION OF THE BINARY PHASE DIAGRAM, NIOBIUM-ALUMINUM (PHASE I). DETERMINATION OF THE NIOBIUM-RICH REGION OF THE TERNARY PHASE DIAGRAM, NIOBIUM-ALUMINUM-ZIRCONIUM (PHASE II) by Charles E. Lundin and Albert S. Yamamoto. Monthly letter rept. no. 5, 1 Jan-1 Feb 62, on Contract AT(11-1)-1092. 8 Feb 62, 4p.

APEX-680 $1.25

General Electric Co., Cincinnati, Ohio.
CHROMIUM-BASE ALLOY DEVELOPMENT, by J. E. Fox. Rept. on Contracts AF 33(600)38062 and AT(11-1)-171. Apr 62, 58p. 17 refs.

DC-59-11-164 $1.60

General Electric Co., Cincinnati, Ohio.
CLEANING BY ION BOMBARDMENT, by J. J. Roseman. Rept. on Contract AT(11-1)-171. 28 Sep 59, 14p.

HW-71794 $1.00

Hanford Atomic Products Operation, Richland, Wash.
BRITTLE FRACTURE OF STEEL, 1950-1961, comp. by E. R. Appleby. 6 Dec 61, 41p. 211 refs.

AD-270 008 repriced $2.25

Sylcor Div., Sylvania Electric Products, Inc., Bayside, N. Y.
HIGH TEMPERATURE OXIDATION RESISTANT COATINGS FOR TANTALUM BASE ALLOYS, by Dean D. Lawthers and L. Sama. Rept. for 1 June 60-31 May 61, on Contract AF 33(616)7462. Oct 61, 82p. 5 refs. ASD Technical rept. 61-233.

DESCRIPTORS: Tantalum, *Tantalum alloys, Tungsten alloys, Tungsten, Niobium alloys, Hafnium alloys, Molybdenum, Refractory materials, Heat resistant alloys, Coatings, *Oxidation inhibitors, Metal coatings, *Refractory coatings, Intermetallic compounds, Tantalum compounds, Tin compounds, Aluminum compounds, Beryllium compounds, Microstructure, Thermal expansion, Failure (Mechanics), Diffusion, Manufacturing methods, Flame spraying, Test methods, Heating, High temperature research.

Aluminide and beryllide coatings were investigated for pure tantalum, a commercial Ta-10 W alloy, and a ternary alloy under development. Coatings were applied by dipping, packing, cold spraying, and vapor deposition. Oxidation resistance was evaluated by furnace testing, resistance heating, and flame testing.

Internal hardening and diffusion effects were also studied. A Sn-Al coating was developed, which has excellent oxidation resistance for 10 hours to at least 3000 F. Evaluation was successfully extended to arc-plasma tests which also showed the feasibility of protecting Mo and W. A similar but minor effort investigation was performed with a Nb alloy which could be protected to 2500 F for at least 10 hours. (Author)

Light Metals

PB 159 873 $1.10

Beryllium Corp., Reading, Pa.
FORGED FOX DEVELOPMENT PROGRAM, by J. P. Denny. 6 Dec 60, 8p. LMSD Order no. 18-2157.

DESCRIPTORS: *Beryllium, *Powder metallurgy, *Forging, Encapsulation, Containers, Steel, Forge presses, Cooling, Pickling, Machining.

Beryllium powder was encapsulated within steel containers and press forged to 0.8 inch wall thickness in an attempt to reduce the quantities beryllium powder required for the part. The resultant forged FOXES were cooled, dejacketed, and machined to dimensions protecting the final component. (Author)

PB 159 872 $2.60

Lockheed Aircraft Corp., Sunnyvale, Calif.
BERYLLIUM ANALYZED FOR TRACE IMPURITIES BY GAMMA-RAY ACTIVATION, by W. Bradshaw, R. Johnson, and D. Beard. Technical note on Contract NOrd-17017. Jan 60, 28p. 18 refs. LMSD-288231; AD-239 346.

DESCRIPTORS: *Beryllium, Impurities, *Radioactivation analysis, Oxygen, Carbon, Nitrogen, Gamma rays, Linear accelerators.

Investigations were undertaken to develop a method for the analysis of trace quantities of oxygen, carbon, and nitrogen in high-purity beryllium. The gamma-ray activation method for beryllium has been used, with a precision of 20 percent, to detect trace quantities of 10 to 5000 ppm oxygen and 100 to 25,000 ppm carbon. For high-purity material, and in the absence of other interfering activities, the minimum amount of oxygen and carbon detectible is expected to be 1 ppm with a precision of ± 5%. The method could be used to estimate nitrogen content, when the Fe and Cu contents of the sample are accurately known. The technique is used as a reference method for the development of ultra-high-purity beryllium and as a standard method for the evaluation of analytical techniques for oxygen. It is the only method available for the analysis of carbon contained in beryllium in the range of 10 to 1000 ppm.

PB 159 874 $2.60

Lockheed Aircraft Corp., Burbank, Calif.
BERYLLIUM FORMABILITY TESTS FOR LMSD, by L. C. Kantner. Rept. on Contract NOrd-17017. 23 Sep 59, 21p. Rept. no. 14027.

DESCRIPTORS: *Beryllium, Sheets, Tensile properties, Temperature, Tests, Fracture (Mechanics).

The results of these tests indicate that beryllium sheet cannot be formed at room temperature. (Author)

PB 159 875 $4.60

Sylvania-Corning Nuclear Corp., Bayside, N. Y.
FEASIBILITY STUDY FOR DIRECT ROLLING OF BERYLLIUM POWDERS, by K. H. Moyer and I. Sheinhartz. Final rept. 15 Apr-30 Nov 59, on Subcontract to Contract NOrd-17017. Jan 60, 43p. Rept. no. SCNC-305. LMSD 495674.

DESCRIPTORS: *Beryllium, *Metal powders, *Powder metallurgy, Rolling mills, Sintering, Sheets, Argon, Annealing, X-ray diffraction analysis.

The feasibility of making beryllium sheet by the direct rolling of beryllium powder was demonstrated. A green strip was formed by passing beryllium powder through a rolling mill. This green strip was subsequently sintered in argon or vacuum, rerolled and annealed to form a fully dense beryllium sheet. Properties of the material made by sintering in an argon atmosphere were essentially the same as those of the vacuum sintered material; however, in the former material, there was considerably less loss of material due to vaporization. The finished sheet had a tensile strength of approximately 49,000 psi and an elongation of 0.2%. It is believed that the low ductility was mainly due to the thinness of the sheet. The maximum finished thickness was 0.008". X-ray diffraction tests indicated that the final sheet had a random structure. (Author)

NUCLEAR PHYSICS AND NUCLEAR CHEMISTRY

WAPD-T-1065 $1.60

Bettis Atomic Power Lab., Pittsburgh, Pa.
SPACE-ENERGY SEPARABILITY IN THE THERMAL NEUTRON GROUP, by E. Gelbard, J. Davis, and J. Pearson. Rept. on Contract AT-11-1-GEN-14. Nov 59, 14p.

Presented at the 1959 Winter Meeting of the American Nuclear Society, Washington, D. C.

DC-60-2-295 $1.10

General Electric Co., Cincinnati, Ohio.
AN ALTERNATE METHOD OF COMPUTING RESONANCE ABSORPTION AND RESONANCE ESCAPE PROBABILITY IN INTERMEDIATE REACTORS, by P. G. Fischer. Rept. on Contract AT(11-1)-171. 25 Feb 60, 12p.

DC-57-11-77 $2.60

General Electric Co., Cincinnati, Ohio.
DESCRIPTION OF ANPD SHIELDING COMPUTER PROGRAMS, by Mary Ann Capo. Rept. on Contract AT(11-1)-171. 29 Oct 57, 31p.

DC-59-12-221 $1.60

General Electric Co., Cincinnati, Ohio.
PULSED NEUTRON MEASUREMENTS ON BERYLLIUM OXIDE, by K. W. Seemann. Rept. on Contract AT(11-1)-171. 30 Dec 59, 15p.

DC-59-11-5 $1.60

General Electric Co., Cincinnati, Ohio.
THE RADIATION-OXIDATION TESTING OF BERYLLIUM METAL SPECIMENS: TEST LTBM-1, LTBM-2, AND LTBM-3 (1957), by R. C. Lee. Rept. on Contract AT(11-1)-171. Tests run in 1957, rept. issued 21 Oct 59, 18p. (In cooperation with Oak Ridge National Lab., Tenn.)

DC-58-4-121 $8.10

General Electric Co., Cincinnati, Ohio
SHIELDING COMPUTER PROGRAM 04-1, REACTOR SHIELD ANALYSIS, by W. E. Edwards, M. A. Capo, and K. Paine. Rept. on Contract AT(11-1)-171. 11 Apr 58, 83p.

NAS-NS-3051 $0.50

Hanford Atomic Products Operation, Richland, Wash.
THE RADIOCHEMISTRY OF NICKEL, by L. J. Kirby. Nov 61, 56p. 126 refs.

NYO-9771 $2.75

Johns Hopkins U., Baltimore, Md.
STATISTICAL ANALYSIS OF THE FREQUENCY AND SEVERITY OF ACCIDENTS TO POTENTIAL HIGHWAY CARRIERS OF HIGHLY RADIOACTIVE MATERIALS, by F. F. Leimkuhler, M. J. Karson, and J. T. Thompson. Rept. on Contract AT(30-1)-1477. July 61, 187p.

KAPL-2182 $1.25

Knolls Atomic Power Lab., Schenectady, N. Y.
A STUDY OF THE LITHIUM-BORON-CARBON SYSTEM, by D. R. Secrist. Rept. on Contract W-31-109-eng-52. 17 Jan 62, 39p. 24 refs.

UCRL-5916 $3.60

Lawrence Radiation Lab., U. of California, Livermore.
ANALYSIS OF THE MOON'S SURFACE BY NUCLEAR REACTIONS, by E. F. Martina (Space Technology Labs., Los Angeles) and Carlton D. Schrader. Rept. on Contract W-7405-eng-48. 1 Apr 60, 33p. STL/TR-60-0000-00078.

UCRL-9999 $1.50

Lawrence Radiation Lab., U. of California, Berkeley
BIBLIOGRAPHY ON PION-PION INTERACTION, by M. Lynn Stevenson. Rept. on Contract W-7405-eng-48 7 Nov 61, 66p. 482 refs.

UCRL-5967-T $1.10

Lawrence Radiation Lab., U. of California, Livermore.
NUCLEAR EMULSION EXPERIMENTS IN THE INNER RADIATION BELT, by Stanley C. Freden, Albert J. Oliver, and R. Stephen White. Rept. on Contract W-7405-eng-48. [1959] 6p.

NYO-10194 $1.00

Little, Arthur D., Inc., Cambridge, Mass.
THE EFFECT OF ELECTROPHILIC ADDITIVES ON THE RADIOLYTIC PRODUCTS OF ORGANIC CHAIN REACTIONS, by E. I. Heiba. Annual rept. on Contract AT(30-1)-2551. 30 Sep 61, 34p. 4 refs.

NAS-NS-3052 $0.75

Michigan U., Ann Arbor.
THE RADIOCHEMISTRY OF PALLADIUM, by Ove T. Høgdahl. Dec 61, 66p. 117 refs.

K-1455 $7.60

Oak Ridge Gaseous Diffusion Plant, Tenn.
SOME VALUE FUNCTIONS FOR MULTICOMPONENT ISOTOPE SEPARATION: APPLICATION TO A UNIT COST SCALE FOR URANIUM-235, 236, 238 MIXTURES, by A. de la Garza, G. A. Garrett, and J. E. Murphy. Rept. on Contract W-7405-eng-26. 19 July 60. 76p.

NAS-NS-3053 $0.50

Oak Ridge National Lab., Tenn.
THE RADIOCHEMISTRY OF RUBIDIUM, by G. W. Leddicotte. Feb 62, 38p. 91 refs.

SCR-463 $0.50

Sandia Corp., Albuquerque, N. Mex.
NEUTRON FLUX AND SPECTRA MEASUREMENTS IN THE SANDIA PULSED REACTOR FACILITY (SPRF), by W. H. Buckalew. Jan 62, 27p. 3 refs.

Elementary Particles

PB 159 720 $1.60

[High-Energy Physics Lab.] Stanford U., Calif.
THE DIRAC AND PAULI FORM FACTORS OF THE NEUTRON, by R. Hofstadter, C. de Vries, and Robert Herman (General Motors Corp.) [Rept. on Contract N6onr-251(16)]. [1961] 12p. 15 refs. HEPL-232.

DESCRIPTORS: *Neutrons, Deuterons, Electrons, Inelastic scattering, Deuteron cross sections, Proton cross sections, Quantum mechanics.

The chief result of this paper is the independent experimental determination of the two form factors of the neutron (F_{1N}, F_{2N}) and a verification that $F_{1N} \neq 0$.

PB 159 719 $1.60

[High-Energy Physics Lab.] Stanford U., Calif,
THE ELECTRIC AND MAGNETIC STRUCTURE OF THE PROTON AND NEUTRON, by R. Hofstadter and Robert Herman (General Motors Corp.) [Rept. on Contract N6onr-251(16)]. [1961] 12p. 15 refs. HEPL-233.

DESCRIPTORS: *Protons, *Neutrons, Electromagnetic properties, Magnetic moments, Nuclear magnetic moments, Nuclear structure.

This paper presents a unified interpretation of the presently known experimental data on the electromagnetic form factors of two fundamental particles: the proton and the neutron. This interpretation is fully consistent with the idea that the two particles are two different aspects of a single entity--the nucleon. The third component of the isotopic spin of the nucleon is used to distinguish between the two fundamental particles. The new experimental material on the neutron form factors, which now completes a block of information on the proton and neutron, has served as the stimulus for the attempted explanation.

PB 159 718 $4.60

High-Energy Physics Lab., Stanford U., Calif.
ELECTRON-ELECTRON SCATTERING AT 500 Mev, by E. B. Dally. Rept. on Contract N6onr-25116. 31 Mar 61, 42p. 29 refs. HEPL-235.

DESCRIPTORS: *Electrons, Scattering, Electron beams, Electron accelerators, Differential cross sections, Elastic scattering, Perturbation theory, Quantum mechanics, Corrections, Beryllium, Targets, Foils, Electron bombardment, Magnetic spectrometers.

The electron-electron differential scattering cross section has been measured with the use of a 500 Mev electron beam from the Stanford Mark III linear electron accelerator. Deviations were sought from the theoretical cross section as calculated in first order perturbation theory (Møller scattering). The experimental results were compared with the Møller formula as corrected to the next order in perturbation theory by the work of Tsai.

PB 159 721 $6.60

High-Energy Physics Lab., Stanford U., Calif.
ELECTRON-SCATTERING STUDY OF NUCLEAR LEVELS IN COBALT, NICKEL, LEAD, AND BISMUTH, by H. Crannell, R. Helm, and others. Rept. on Contract N6onr-25116. 8 Mar 61, 66p. 11 refs. HEPL-219.

DESCRIPTORS: *Electrons, Scattering Inelastic scattering, Elastic scattering, Cobalt, Nickel, Lead Bismuth, Isotopes, Nuclei, Nuclear energy, Nuclear energy levels.

We have observed observations of inelastic scattering of 183-Mev electrons through angles of 35^{o}-90^{o} in the laboratory, leading to excitation of discrete nuclear excited states in Ni^{58}, Co^{59}, Ni^{60}, Pb^{208}, and Bi^{209}. Some of the observed results are expected on the basis of the theory of collective vibrational excited states; some are the consequence of unidentified configurations.

PB 159 871 $2.60

High-Energy Physics Lab., Stanford U., Calif.
MEASUREMENT OF THE NEUTRON-PROTON FINAL-STATE INTERACTION IN THE ELECTRODISINTEGRATION ON DEUTERIUM, by H. W. Kendall, J. I. Friedman and others. Rept. on Contract N6onr-25116. 6 July 61, 27p. 13 refs. HEPL-220.

DESCRIPTORS: *Neutrons, *Protons, Nuclear reactions, Differential cross sections, Elastic scattering, Inelastic scattering, *Deuterium, Radioactive decay, Nuclear energy.

Measurements have been made of the inelastic differential cross sections for electrodisintegration of deuterium for $\mathcal{E}$ in the range from 0 to 12 Mev, where $\mathcal{E}$ is the energy in the n-p center-of-mass system in the final state.

PB 157 556 $3.60

Institute of Theoretical Physics, Stanford U., Calif.
COHERENT PHOTOPRODUCTION OF π^0 FROM DEUTERIUM, by Fokion T. Hadjioannou. Technical note no. 34 on Contract AF 49(638)388. May 61, 32p. 8 refs. AFOSR-TN-919.

DESCRIPTORS: *Mesons, *Pions, Production, Differential cross sections, Deuterons, *Deuterium, Nuclear structure.

The calculation of elastic photoproduction of π^0 mesons from deuterium, $\gamma + D \rightarrow \pi^0 + D$, is carried out in the impulse approximation at photon energies around 500 Mev.

PB 156 680 $2.60

Institute of Theoretical Physics, Stanford U., Calif.
MAGNETIC DISPERSION CORRECTIONS TO ELASTIC ELECTRON SCATTERING, by Abraham Goldberg. Technical note no. 33 on Contract AF 49(638)388. Mar 61, 26p. 15 refs. AFOSR-662.

DESCRIPTORS: *Electrons, *Elastic scattering, Scattering, Magnetic moments, Dipole moments, Corrections, Nuclear spins, Nuclear reactions, Quantum mechanics.

UCRL-9841 $2.00

Lawrence Radiation Lab., U. of California, Berkeley
PHOTOPRODUCTION OF π^+ IN HYDROGEN, by Donald A. McPherson. Rept. on Contract W-7405-eng-48. 19 Oct 61, 84p. 25 refs.

MURA-574 $0.50

Midwestern Universities Research Association, Madison, Wis.
ON THE NEUTRINOS EMITTED IN β-DECAY AND μ-CAPTURE, by S. P. Rosen. Rept. on Contract AT(11-1)-384. Apr 62, 8p. 7 refs.

Instruments and Installations

DC-60-2-22 $8.10

General Electric Co., Cincinnati, Ohio.
ASSEMBLY, INSTALLATION, OPERATION AND CONTROL INSTRUCTIONS FOR D103A NUCLEAR SENSORS, by R. R. Swope. Rept. on Contracts AT(11-1)-171 and AF 33(600)38062. 15 Feb 60, 89p.

DC-60-12-26 $4.60

General Electric Co., Cincinnati, Ohio
CALCULATED RESPONSE FUNCTIONS OF GAMMA RAY SPECTROMETER, by E. H. Brooks. Rept. on Contract AT(11-1)-171. 1 Dec 60, 50p.

DC-59-11-29 $6.60

General Electric Co., Cincinnati, Ohio.
IONIZATION CHAMBER CURRENT, by N. M. Gralenski. Rept. on Contract AT(11-1)-171. 4 Nov 59, 66p.

DC-57-2-76 $4.60

General Electric Co., Cincinnati, Ohio.
NUCLEAR INSTRUMENTS REQUIRED FOR AN EFFECTIVE SHIELD MEASUREMENT PROGRAM TO FULFILL PROJECT AND DESIGN REQUIREMENTS, by John Moteff. Rept. on Contract AT(11-1)-171. 14 Feb 57, 46p.

DC-60-1-106 $1.60

General Electric Co., Cincinnati, Ohio.
STUDY OF ABSOLUTE CALIBRATION OF GAMMA RAY SOURCES, by V. J. Mitchell. Rept. on Contract AT(11-1)-171. 7 Jan 60, 17p.

DC-58-4-54 $1.60

General Electric Co., Cincinnati, Ohio
WATER-AIR BOUNDARY DOSE RATE MEASUREMENTS USING A COBALT-60 SOURCE, by V. J. Mitchell and R. B. Smith. Rept. on Contract AT(11-1)-171. 7 Apr 58, 18p.

UCRL-9981 $0.50

Lawrence Radiation Lab., U. of California, Berkeley.
BEVATRON OPERATION AND DEVELOPMENT. XXX, by Walter D. Hartsough. Rept. May-July 61, on Contract W-7405-eng-48. 2 Jan 62, 12p.

Nuclear Engineering and Power

APAE-Memo-302 $3.60

Alco Products, Inc., Schenectady, N. Y.
SM-1 REACTOR VESSEL COVER AND FLANGE STRESS ANALYSIS, by M. F. Sayre. Rept. on Contract AT(30-1)-2639. 19 Feb 62, 33p.

ANL-6478 $1.50

Argonne National Lab., Ill.
DYNAMIC ANALYSIS OF THE OPERATION OF EBWR AT 100 Mw, by N. Suda and F. Rehbach. Rept. on Contract W-31-109-eng-38. Dec 61, 65p. 13 refs.

ANL-6462 $1.00

Argonne National Lab., Ill.
EBR-II DRY CRITICAL EXPERIMENTS. EXPERIMENTAL RESULTS, by R. L. McVean, G. S. Brunson and others. Rept. on Contract W-31-109-eng-38. Feb 62, 39p. 6 refs.

NAA-SR-5700(Suppl. 2) $8.10

Atomics International, Canoga Park, Calif.
ADDITIONAL INFORMATION ON DRY, ZERO-POWER EXPERIMENTS IN HNPF. Rept. on Contract AT(11-1)-GEN-8. Sep 61, 86p.

NAA-SR-5700(Suppl. 3) $10.50

Atomics International, Canoga Park, Calif.
ADDITIONAL SAFEGUARDS INFORMATION FOR HALLAM NUCLEAR POWER FACILITY. Rept. on Contract AT-11-1-GEN-8. Nov 61, 138p.

NAA-SR-5700(Suppl. 4) $17.00

Atomics International, Canoga Park, Calif.
ADDITIONAL SAFEGUARDS INFORMATION FOR HALLAM NUCLEAR POWER FACILITY. Rept. on Contract AT-11-1-GEN-8. 1 Dec 61, 262p.

NAA-SR-5943 $2.50

Atomics International, Canoga Park, Calif.
EVALUATION OF ZIRCONIUM HYDRIDE AS MODERATOR IN INTEGRAL, BOILING WATER-SUPERHEAT REACTORS, by J. D. Gylfe, H. Rood and others. Rept. on Contract AT(11-1)-GEN-8. 1 Mar 62, 135p. 38 refs.

NAA-SR-6769 $1.00

Atomics International, Canoga Park, Calif.
AN EXPERIMENTAL STUDY OF SODIUM POOL BOILING HEAT TRANSFER, by R. C. Noyes. Rept. on Contract AT(11-1)- GEN-8. 30 Mar 62, 37p. 22 refs.

NAA-SR-5700(Suppl. 1) $3.60

Atomics International, Canoga Park, Calif.
SAFEGUARDS REPORT ON DRY, ZERO-POWER EXPERIMENTS IN HNPF. Rept. on Contract AT-11-1-GEN-8. 22 Sep 61, 31p.

NAA-SR-6226 $0.50

Atomics International, Canoga Park, Calif.
VACUUM INDUCTION MELTING AND CASTING OF URANIUM-SILICON ALLOYS, by N. H. Katz and M. H. Binstock. Rept on Contract AT(11-1)-GEN-8. 15 Mar 62, 22p. 7 refs.

NAA-SR-6880 $0.50

Atomics International, Canoga Park, Calif.
X-RAY STUDIES OF δ AND ϵ ZIRCONIUM HYDRIDES, by W. L. Korst. Rept. on Contract AT(11-1)-GEN-8. 30 Mar 62, 19p. 28 refs.

WAPD-TM-286 $2.25

Bettis Atomic Power Lab., Pittsburgh, Pa.
AN APPRAISAL OF THE MIM AND ART DIFFERENCING METHODS EMPLOYING M0076, A DIGITAL FREQUENCY ANALYSIS PROGRAM, by J. V. Reihing Jr. and W. G. Clarke. Rept. on Contract AT(11-1)-GEN-14. Dec 61, 99p. 9 refs.

WAPD-BT-24 $2.25

Bettis Atomic Power Lab., Pittsburgh, Pa.
BETTIS TECHNICAL REVIEW. REACTOR TECHNOLOGY. Rept. on Contract AT(11-1)-GEN-14. Dec 61, 104p. 4 refs.

CEND-1009 $2.25

Combustion Engineering, Inc., Idaho Falls,
SL-1 ANNUAL OPERATING REPORT, FEBRUARY 1960-JANUARY 3, 1960. Rept. on Contract AT(10-1)-967. 15 June 61, 111p.

DLCS-3590601 $3.60

Duquesne Light Co., Shippingport, Pa.
1D MAIN COOLANT PUMP (ALLIS-CHALMERS NO. 80) POWER SUPPLY CHECK. Test Evaluation. Section 6. First issue 22 Aug 61, Second issue 2 Feb 62. 39p.

GA-2493 $3.00

General Atomic Div., General Dynamics Corp., San Diego, Calif.
40-MW(E) PROTOTYPE HIGH-TEMPERATURE GAS-COOLED REACTOR. Quarterly progress rept. for period ending 30 June 61, on Contract AT(04-3)-314. Feb 62, 219p. 29 refs.

DC-58-8-708 $1.60

General Electric Co., Cincinnati, Ohio.
ANALYSIS OF IN-PILE TEST SAMPLES USING THE "650 PROGRAM FOR OFF-DESIGN PRESSURE LOSS CALCULATIONS", by D. J. Holtslag and D. J. Liffengren. Rept. on Contract AT(11-1)-171. 8 Aug 58, declassified 26 July 61. 13p.

DC-59-11-158 $1.10

General Electric Co., Cincinnati, Ohio.
ANALYSIS OF LIVERMORE GRAPHITE MODERATED CRITICAL EXPERIMENT AND COMPARISON WITH EXPERIMENTAL DATA, by E. R. White. Rept. on Contract AT(11-1)-171. 20 Oct 59, 7p.

DC-57-10-46 $9.10

General Electric Co., Cincinnati, Ohio.
ANALYSIS OF 2πI EXPERIMENTS. MILESTONE I - TASK 7711, by L. S. Burns. Rept. on Contract AT(11-1)-171. 30 Sept 57, 104p.

DC-60-2-210 $1.60

General Electric Co., Cincinnati, Ohio.
CLAD MATERIAL FOR ETR PROGRAM: OXIDATION RESISTANCE OF VARIOUS NiCr ALLOYS, by P. T. Ryan. Rept. on Contract AT(11-1)-171. 17 Feb 60, 17p.

DC-60-6-53 $2.60

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DATA RESULTS FROM LPT #3-4 AND LPT #3-5, by S. W. Gabriel, G. R. Lewis, and L. S. Mason. Rept. on Contract AT(11-1)-171. 1 Oct 59, declassified 26 July 61. 102p.

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DIRECT CYCLE NUCLEAR POWER PLANT STABILITY ANALYSIS, by D. Buden and R. F. Miller. Rept. on Contract AT(11-1)-171. 6 July 60, 30p.

DC-56-5-157 $1.60

General Electric Co., Cincinnati, Ohio
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DC-55-7-96 $3.60

General Electric Co., Cincinnati, Ohio.
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NICHROME EVALUATION PROGRAM, by R. A. Church. Rept. on Contract AT(11-1)-171. 20 Nov 59, 27p.

DCL-60-1-72 $1.10

General Electric Co., Cincinnati, Ohio.
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DCL-60-1-73 $1.60

General Electric Co., Cincinnati, Ohio.
POST-IRRADIATION METALLOGRAPHIC ANALYSIS OF MTR-GE-ANP-1V1 AND 1Y1, by W. V. Ketron. Rept. on Contract AT(11-1)-171. 17 Apr 59, 19p.

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POST-OPERATIONAL EXAMINATION OF ANP-1CR2B; GAMMA SCANNING AND BURN-UP ANALYSIS, by L. L. Reed. Rept. on Contract AT(11-1)-171. 21 Oct 59, declassified 26 July 61, 8p.

DC-60-6-735 $18.00

General Electric Co., Cincinnati, Ohio
PRELIMINARY DATA REPORT IET TEST SERIES NO. 18 PHASE II TESTING OF THE D102A2 POWER PLANT, by J. W. Highberg, K. J. Skow and others. Rept. on Contract AT(11-1)-171. 17 June 60, 288p.

DC-59-11-3 $1.10

General Electric Co., Cincinnati, Ohio.
PRELIMINARY EVALUATION OF A PROPOSED FUEL MATERIAL FOR HIGH TEMPERATURE REACTORS, by E. F. Jeunke. Rept. on Contract AT(11-1)-171. 28 Oct 59, declassified 26 July 61. 5p.

DC-59-10-185 $1.60

General Electric Co., Cincinnati, Ohio
THE RADIATION TESTING OF A FUEL ELEMENT - TEST LVC-2, by R. E. Blevins. Rept. on Contract AT(11-1)-171. 16 Oct 59, 14p.

GEMP-71 $1.00

General Electric Co., Cincinnati, Ohio.
REACTOR INSTRUMENTATION AND CONTROL. Progress rept. no. 71, 1 Dec 61-1 Mar 62, on Contract AT(40-1)-2847. 42p. 2 refs.

DC-60-5-727 $2.60

General Electric Co., Cincinnati, Ohio.
THE RELATION BETWEEN CATCHER FOIL ACTIVITY AND FISSION RATE IN 93% ENRICHED URANIUM METAL, by J. F. Kunze and J. W. Churchill Rept. on Contract AT(11-1)-171. 13 May 60, 26p.

DC-55-6-133 $1.60

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REPORT OF INVENTION ON NUCLEAR FUSES, by I. L. Helms, Jr. Rept. on Contract AT(11-1)-171. 23 June 55, 15p.

DC-59-11-196 $3.60

General Electric Co., Cincinnati, Ohio.
A REPORT OF THE IN-PILE TESTING OF TWELVE BOURNS TRIMPOTS - XCI-42, by H. C. Colley. Rept. on Contract AT(11-1)-171. 11 Nov 59, 33p.

DC-56-12-37 $4.60

General Electric Co., Cincinnati, Ohio.
SOLID MODERATOR DEVELOPMENT - MILESTONE D. EVALUATION OF CLAD HYDRIDED ZIRCONIUM AS SOLID MODERATOR, by C. L. Huffine. Rept. on Contract AT(11-1)-171. 29 Nov 56, 42p.

DC-55-5-17 $3.60

General Electric Co., Cincinnati, Ohio.
STUDY OF CONDITIONS AFFECTING COMBUSTION OF NICHROME AND STAINLESS STEEL, by Warren H. Smith. Rept. on Contract AT(11-1)-171. 29 Apr 55, 34p.

DC-60-4-84 $1.60

General Electric Co., Cincinnati, Ohio.
SUMMARY REPORT: MTR TEST 1T1, by C. L. Miller. Rept. on Contract AT(11-1)-171. 13 Apr 60, declassified 5 Dec 61. 17p.

DC-57-11-176 $3.60

General Electric Co., Cincinnati, Ohio.
TUBE BUNDLE CALCULATIONS, by J. McCurdy. Rept. on Contract AT(11-1)-171. 22 Nov 57, 35p.

DC-55-12-110 $1.60

General Electric Co., Cincinnati, Ohio.
THE USE OF DEPLETED URANIUM IN THE AC-110 SHIELD, by Miles J. Todd. Rept. on Contract AT(11-1)-171. 21 Dec 55, 18p.

GEAP-3528(Rev. 1) $2.75

General Electric Co., San Jose, Calif.
AUTOMATIC CONTROL OF T7 TANKER BOILING WATER REACTOR PROPULSION SYSTEM. PRELIMINARY DESIGN AND ECONOMIC EVALUATION, by R. B. Rice, J. I. Owens and others. Rept. on Contract AT(04-3)-189. 1 Sep 60, 154p.

GEAP-3787 $1.25

General Electric Co., San Jose, Calif.
RESULTS OF AIR-WATER AND STEAM-WATER TESTS ON RADIAL VANE STEAM SEPARATOR MODELS, by J. I. Riesland. Rept. on Contract AT(04-3)-189. Feb 62, 45p.

HW-62347 $1.25

Hanford Atomic Products Operation, Richland, Wash.
EXTRUSION CHARACTERISTICS OF URANIUM-ZIRCONIUM AND URANIUM-CARBON ALLOYS, by J. C. Tverberg and J. J. Holmes. Rept. on Contract AT(45-1)-1350. June 61, 46p. 20 refs.

HW-70310 $2.00

Hanford Atomic Products Operation, Richland, Wash.
MEASUREMENT OF MULTIPLICATION CONSTANT FOR SLIGHTLY ENRICHED HOMOGENEOUS UO_3-WATER MIXTURES AND MINIMUM ENRICHMENT FOR CRITICALITY, by V. I. Neeley and H. E. Handler. Rept. on Contract AT(45-1)-1350. 21 Aug 61, 72p. 9 refs.

HW-69168 $2.25

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PLUTONIUM RECYCLE CRITICAL FACILITY: FINAL SAFEGUARDS ANALYSIS, by J. K. Anderson and W. K. Winegardner. Rept. on Contract AT(45-1)-1350. Feb 62, 108p. 11 refs.

HW-69612 $2.50

Hanford Atomic Products Operation, Richland, Wash.
A STUDY OF RADIONUCLIDE ADSORPTION IN THE K RECIRCULATION LOOPS, by L. D. Perrigo. Rept. on Contract AT(45-1)-1350. May 61, 115p. 23 refs.

UCRL-5974-T $1.10

Lawrence Radiation Lab., U. of California, Livermore.
POSSIBLE APPLICATIONS OF NUCLEAR ENERGY TO THE MINING INDUSTRY, by David D. Rabb. Rept. on Contract (W-7405-eng-48). 15 Aug 58, 7p.

For presentation at the American Mining Congress, 24 Sep 58.

TID-15005 $9.60

Little, Arthur D., Inc., Cambridge, Mass.
SAFETY MONITOR FOR A LIQUID METAL FUEL REACTOR. Rept. for Babcock and Wilcox, Lynchburg, Va. 3 Sep 58, 115p. ALI C-61378.

SRO-54 $2.00

Lockheed Nuclear Products, Marietta, Ga.
APPLICATIONS OF COMPTON BACKSCATTER RADIATION TO NONDESTRUCTIVE TESTING, by J. C. Tolan, C. T. Bradshaw, and K. E. Mears. Rept. on Contract AT(30-1)-2428. 1 Sep 61, 95p. 15 refs. NR-130.

LA-2662 $1.00

Los Alamos Scientific Lab., N. Mex.
A PUNCHED-CARD MACHINE METHOD FOR MANAGEMENT OF NUCLEAR MATERIALS, by E. L. Christensen, J. A. Leary and others. Rept. on Contract W-7405-eng-36. 21 Mar 62, 41p.

NLCO-841 $1.50

National Lead Co. of Ohio, Cincinnati.
PRODUCTION TEST AND EVALUATION OF LARGE UF_4-Mg BRIQUETTES, by W. E. Shaw. Rept. on Contract AT(30-1)-1156. 23 Mar 62, 54p. 1 ref.

NUMEC-P-37 $1.10

Nuclear Materials and Equipment Corp., Apollo, Pa.
DEVELOPMENT OF PLUTONIUM-BEARING FUEL MATERIALS, by Karl H. Puechl. Monthly progress letter for Jan 62 on Contract AT(30-1)-2389. 5 Feb 62, 8p.

IDO-16741 $0.50

Phillips Petroleum Co., Idaho Falls.
SPERT III THERMOWELL FAILURE AND REPLACEMENT, by R. E. Heffner, S. W. Gleave, and J. A. Norberg. Rept. on Contract AT(10-1)-205. 2 Feb 62, 15p. 4 refs.

IDO-16745 $2.50

Phillips Petroleum Co., Idaho Falls.
SPERT IV FACILITY, by R. E. Heffner, E. L. Morris and others. Rept. on Contract AT(10-1)-205. 22 Feb 62, 147p. 4 refs.

DP-668 $0.75

Savannah River Lab., Aiken, S. C.
AN AUTOMATIC GAS CHROMATOGRAPH FOR MONITORING OF REACTOR FUEL FAILURES. PART IV. MODEL 2 DESIGN, by W. R. Kritz. Rept. on Contract AT(07-2)-1. Jan 62, 30p. 3 refs.

DP-662 $0.75

Savannah River Lab., Aiken, S. C.
PRELIMINARY IRRADIATION OF FUSED UO_2, by G. R. Cole. Rept. on Contract AT(07-2)-1. Jan 62, 29p. 16 refs.

Radioactivity

DC-60-2-215 $2.60

General Electric Co., Cincinnati, Ohio.
ANALYSIS OF GAMMA RAY POINT SOURCE DATA FROM SINGLE MATERIAL MEASUREMENTS (MILESTONE II, JOB 51292, TASK 431321). by V. J. Mitchell. Rept. on Contract AT(11-1)-171. 23 Feb 60, 31p.

DC-59-11-85 $5.60

General Electric Co., Cincinnati, Ohio.
DIGITAL ANALYSIS OF FISSION PRODUCT BUILDUP AND DECAY. EA PROBLEM NO. 7-1156 - ANP PROBLEM NO. 153 - TASK 433211 - JOB NO. 51446, by J. A. Delaney. Rept. on Contract AT(11-1)-171. 3 Apr 59, 61p.

DC-59-10-745 $1.60

General Electric Co., Cincinnati, Ohio.
EXPECTED DOSAGES IN THE IET AREA AS A RESULT OF A NUCLEAR ACCIDENT, by L. D. VanVleck. Rept. on Contract AT(11-1)-171. 27 Oct 59, declassified 26 July 61. 15p.

DC-59-12-229 $6.60

General Electric Co., Cincinnati, Ohio.
GAMMA RAY POINT SOURCE DATA FROM SINGLE MATERIAL MEASUREMENTS (MILESTONE I, JOB 51292, TASK 431321), by V. J. Mitchell. Summary rept. on Contract AT(11-1)-171. 31 Dec 59, 66p.

DC-60-4-108 $12.00

General Electric Co., Cincinnati, Ohio.
GAMMA RAY POINT SOURCE DATA FROM MULTIPLE MATERIAL MEASUREMENTS (MILESTONE III, JOB 51292, TASK 431321), by V. J. Mitchell. Summary rept. on Contract AT(11-1)-171. 18 Apr 60, 163p.

DC-60-2-79 $1.60

General Electric Co., Cincinnati, Ohio.
RELAXATION LENGTH OF FAST NEUTRON DOSE RATE IN HYDROGENOUS MATERIAL AS GIVEN BY ALBERT WELTON TYPE POINT KERNELS, by F. Johnson. Rept. on Contract AF(11-1)-171. 8 Feb 60, 13p.

IDO-16740 $0.50

Phillips Petroleum Co., Idaho Falls.
IBM 650 RADIOACTIVE DECAY UTILITY PROGRAM (PPCo-00.053), by A. V. Grimaud. Rept. on Contract AT(10-1)-205. 1 Feb 62, 19p. 5 refs.

PHYSICS

PB 159 867 $1.60

Aeronautical Research Lab. [Office of Aerospace Research] Wright-Patterson AFB, Ohio.
LIGHT AMPLIFICATION AND ITS IMPORTANCE IN MODERN WARFARE, by Radames K. H. Gebel. Rept. on Research on Quantum Nature of Light. Sep 57, 12p. 5 refs. WADC Technical note 57-318; AD-131 047.

DESCRIPTORS: *Light, Amplifiers, Visual thresholds, Iconoscopes, Transducers, Optical equipment, *Military operations, Physiology, Psychology, *Aerial warfare, Warfare, Optics.

The technical possibilities and the scientific limitations of light amplification are outlined. Its importance in military operations is discussed, with reference to the physiological and psychological reactions of the observer, as well as the physical factors. The possible technical approaches to light amplification are explained in the historical sequence of the research applied to them; and probable future developments are discussed. (Author)

UCRL-9845 $0.50

Lawrence Radiation Lab., U. of California, Berkeley.
COLOR PRODUCTION FROM ENERGETIC IONS IMPINGING ON METALS, by Kenneth W. Ehlers. Rept. on Contract W-7405-eng-48. Sep 61, 28p. 13 refs.

SCR-439 $1.50

Sandia Corp., Albuquerque, N. Mex.
MAGNETOGASDYNAMIC ASPECTS, by D. R. Chenoweth. Preliminary rept. Aug 61, 64p. 75 refs.

Molecular Physics and Spectroscopy

AD-270 459 repriced $0.50

Brussels U. (Belgium).
VAPORIZATION OF COMPOUNDS AND ALLOYS AT HIGH TEMPERATURE. PART III. MASS SPECTROMETRIC STUDIES OF THE MOLECULES BC_2 IN THE VAPOR ABOVE THE SYSTEM BORON-CARBON, by Georges Verhaegen, Fred E. Stafford, and Marcel Ackerman. Rept. for Mar 60-Mar 61 on Refractory Inorganic Non-Metallic Materials, Contract AF 61(052)225. Nov 61, 5p. 9 refs. WADD TR-60-782, pt. 3.

DESCRIPTORS: *Refractory materials, *Boron compounds, Silicon compounds, *Carbides, *Vaporization, Dissociation, Vapors, Gases, Thermochemistry Thermodynamics, High temperature research, Mass spectroscopy.

The molecules BC_2 and B_2C were identified in the vapor effusing from a graphite Knudsen cells containing B. The atomization energy of BC_2 was 297 + or - 7 kcal/mole. (Author)

AD-270 458 repriced $0.50

Brussels U. (Belgium).
VAPORIZATION OF COMPOUNDS AND ALLOYS AT HIGH TEMPERATURE. PART VI. STUDIES OF THE VAPORS OF THE SYSTEMS Au-Cr AND Au-Pd BY MASS SPECTROMETRY, by Marcel Ackerman, Fred E. Stafford, and Georges Verhaegen. Rept. for Mar 60-Mar 61 on Refractory Inorganic Non-Metallic Materials, Contract AF 61(052)225. Nov 61, 12p. WADD TR-60-782, pt. 6.

DESCRIPTORS: *Refractory materials, *Transition elements, *Gold alloys, *Chromium alloys, *Palladium alloys, *Vaporization, Dissociation, Vapors, Gases, Thermochemistry, Thermodynamics, High temperature research.

The molecules Au-Cr and Au-Pd have been identified. From the data for the reaction $Au_2 + X = AuX + Au$, and the dissociation energy of $(Au_2) = 51.5$ kcal/mole: the dissociation energy of (AuCr) = 50.4 ± 3.5 kcal/mole and the dissociation energy of (AuPd) = 33.3 ± 5 kcal/mole. (Author)

Solid State Physics

NYO-9434 $3.00

Associated Nucleonics, Inc., Garden City, N. Y.
STABILITY OF PHOSPHORS TO BETA RADIATION, by W. P. Senett, K. Diehl, and R. Wright. Rept. on Contract AT(30-1)-2292. 24 June 60, 180p. 33 refs.

NAA-SR-6481 $0.50

Atomics International, Canoga Park, Calif.
THE FLOW AND RECOVERY PROPERTIES OF NEARLY STOICHIOMETRIC POLYCRYSTALLINE URANIUM CARBIDE AND THE MECHANISM OF WORK HARDENING OF CRYSTALLINE SOLIDS, by R. Chang. Rept. on Contract AT(11-1)-GEN-8. 30 Mar 62, 27p. 12 refs.

PB 159 864 $3.60

Electronic Defense Lab., Mountain View, Calif.
AN INVESTIGATION OF ELECTRIC FIELDS IN ANALOG DIELECTRICS, by Frank C. Douglas. Rept. on Contract DA 36-039-sc-78281. 19 Oct 59, 37p. 7 refs. Technical memo. no. EDL-M155; AD-229 201.

DESCRIPTORS: *Dielectrics, *Crystals, Electric fields, Analog systems, Theory, Tests.

An artificial dielectric was used as the analog of a crystal model subjected to an electric field. The polarizability of the simulated dipoles was measured and compared with a theoretical value. The relative permittivity of a cubic crystal analog was obtained as a function of the number of planes of dipoles it contained; the relative permittivity of a tetragonal crystal analog was obtained as a function of the axis of symmetry lattice constant. An attempt was made to verify a theoretical polarization expression for the local field at a lattice point in a tetragonal crystal. (Author)

PB 157 916 $1.10

Illinois U. [Urbana].
SCREW DISLOCATION IN CRYSTALS WITH DIAMOND STRUCTURE, by V. Celli. Rept. on Contract [AF 49(638)]819. [1960] 10p. 5 refs. AFOSR-TN-60-388.

DESCRIPTORS: *Silicon, *Germanium, *Crystals, Crystal structure, Deformation, Energy, Diamonds, Lattices, Elasticity, Mathematical analysis, Semiconductors.

The model of dislocation in a lattice recently proposed by Maradudin is modified and applied to an estimate of the strain energy of a screw dislocation in crystals with the diamond structure, in particular Si and Ge.

PB 159 413 $2.60

Massachusetts U., Amherst.
A LIGHT SCATTERING STUDY OF THE ANNEALING OF DRAWN POLYTHYLENE, by Marion B. Rhodes and Richard S. Stein. ONR Technical rept. no. 29 on Contract Nonr-2151(00). 13 Feb 61, 30p. 14 refs. AD-252 571.

DESCRIPTORS: Films, *Thin films, Polymers, *Ethylenes, Structures, Microstructure, Photographic analysis, Light, Scattering, Polarization, X-ray diffraction analysis, Stresses, Deformation, Crystals, Theory, *Photoelastic materials, *Photoelasticity, Heat treatment.

Low-angle light scattering patterns are obtained for stretched polyethylene films which are annealed both with and without the constraint of constant length. The effects of stretching temperature, annealing temperature, temperature of measurement and degree of elongation are studied. Changes in morphology of structures having sizes up to several microns occur upon annealing, as revealed by the low-angle photographic light scattering technique. These parallel previously observed changes in the orientation of the individual crystals. Thus, it appears that the explanation of these orientational changes must also be compatible with the accompanying change in the texture of the superstructure. The scattering patterns for heat shrunk samples prove the coexistence of two phases; one having fibrillar symmetry and the other spherical symmetry. The scale of mixing of these two phases has not yet been established. The results are consistent with an annealing mechanism which involves melting of deformed fibrillar crystals and recrystallization in a spherically symmetrical phase. (Author)

AD-269 926 repriced $0.50

New York U., N. Y.
A STUDY OF A CLASS OF INTERMETALLIC COMPOUNDS, THE CHALCOPYRITES, by Irving Cadoff. Final rept. for Sep 60-Jan 61, on Solid State Research and Properties of Matter, Contract AF 33(616)3959. Sep 61, 18p. 2 refs. ARL 67.

DESCRIPTORS: *Intermetallic compounds, *Pyrites, *Tellurides, *Selenides, Semiconductors, Copper compounds, Iron compounds, Sulfides.

Twenty five compositions of the form ABC_2 were investigated for possible formation of chalcopyritic semiconducting compounds. Three of the twenty five formed single phase structures on direct reaction of participating elements and normal solidification. They were $AgInTe_2$, $CuInTe_2$ and $CuFeSe_2$. $AgInTe_2$ and $CuInTe_2$ were found to form a continuous series of solid solutions corresponding to $Ag_xCu_{(1-x)}InTe_2$.

Evidence for the formation of $CuFeTe_2$ was found but a single phase compound could not be obtained via normal melting techniques. (Author)

PB 181 175 $0.50

Plastics Lab., Princeton U., N. J.
SEMICONDUCTING POLYMERS, by H. A. Pohl, J. A. Bornmann, and W. Itoh. Rept. on Contract DA 36-039-sc-78105. 30 Jan 61, 12p. 4 refs. Technical rept. no. 60C; AD-251 519.

DESCRIPTORS: *Semiconductors, Polymers, Phenols, Synthesis, Temperature, Resistance, Conductivity, Anhydrides.

Fifty-two polymers have been prepared with resistivities varying from 10 to the 4th power to 10 to the 11th power ohm-cm. These polymers were formed by a reaction similar to the formation of phenolphthalein from phenol and phthalic anhydride, however, 20 aromatic hydrocarbons and 4 aromatic anhydrides were used in place of the phenol and phthalic anhydride, respectively. The temperature dependence of resistivity and Seebeck Coefficient were measured for some of the polymers. The behavior of these two properties can be described by a model assuming intrinsic conductivity. (Author)

Thermodynamics

DC-60-6-57 $1.60

General Electric Co., Cincinnati, Ohio
CHROMEL-ALUMEL FLATTENED, "SEALED-SHEATH" THERMOCOUPLE FABRICATION AND LIFE TESTING, by J. F. Been. Rept. on Contract AT(11-1)-171. 7 June 60, 18p.

DC-60-5-45 $9.60

General Electric Co., Cincinnati, Ohio.
INDUCED THERMAL ERROR FOR THERMOCOUPLES ATTACHED TO THIN PLATES, by R. A. Boudreaux. Rept. on Contract AT(11-1)-171. 9 May 60, 96p.

DC-60-11-165 $8.60

General Electric Co., Cincinnati, Ohio
AN INVESTIGATION SEEKING COMMON AND EXTENSION WIRE FOR USE AT HIGH TEMPERATURE WITH Pt vs Pt-10%Rh THERMOCOUPLES, by R. J. Freeman. Rept. on Contract AT(11-1)-171. 30 Nov 60, 92p.

DC-59-12-36 $1.10

General Electric Co., Cincinnati, Ohio.
THE THERMO ANEMOMETER ALNOR TYPE 8500, by F. E. Simkins. Rept. on Contract AT(11-1)-171. 24 Nov 59, 11p.

DC-60-2-163 $3.60

General Electric Co., Cincinnati, Ohio.
THE USE OF THE CHROMEL A VERSUS 875 ALLOY THERMOCOUPLE SYSTEM FOR MEASUREMENT OF FUEL ELEMENT AND DISCHARGE AIR TEMPERATURE, by J. W. Glasgow. Rept. on Contract AT(11-1)-171. 22 Feb 60, declassified 5 Dec 61. 40p.

PB 161 631 $3.00

National Bureau of Standards, Boulder, Colo.
PROVISIONAL THERMODYNAMIC FUNCTIONS FOR PARA-HYDROGEN, by Hans M. Roder and Robert D. Goodwin. Dec 61, 157p. 13 refs. Technical note no. 130.

DESCRIPTORS: *Hydrogen, *Thermodynamics, Gases, Specific heat, Vapor pressure, Liquids, Density, Equations of state, Entropy, Enthalpy, Temperature, Pressure.

New PVT data recently obtained at this laboratory were used to compute tabular values of internal energy, enthalpy, and entropy of para-hydrogen. These properties, together with specific volume, are presented here as functions of temperature and pressure. The new data encompassed the temperature range 20° to 100°K at pressures up to 340 atm. Earlier data were used to extend the tables to 300°K. Above 100°K the upper limit of pressure is 100 atm. The information is also presented in the form of thermodynamic charts. In supplement A to this report the thermodynamic tables and charts are presented in units of: psia, degrees Rankine, BTU, pounds, and cubic feet. (Author)

RESEARCH METHODS, TECHNIQUES AND EQUIPMENT

AD-269 800 $1.00

Armed Services Technical Information Agency, Arlington, Va.
INFORMATION THEORY. AN ASTIA REPORT BIBLIOGRAPHY, by Herman W. Miles. Jan 62, 58p. 294 refs.

DESCRIPTORS: *Information theory, Communication systems, Communication theory, Data transmission systems, Computers, Coding, Aerial warfare, Strategic air command, *Bibliography, Human engineering, Reaction (Psychology), Psychometrics, Auditory perception, Visual perception, Psychology, Learning, Cybernetics, Group dynamics.

This bibliography was prepared in response to frequent inquiries concerning information theory. References are included for documents cataloged by ASTIA from 1953 through 1 January 1962. Citations are arranged alphabetically by subject areas, which include references on behaviorial applications, channel capacity, coding, communication systems and theory, data transmission systems, and computer design. Within each subject area, reports published by Department of Defense contractors are listed alphabetically by source, contract, and dates military reports are arranged by source and title. (Author)

AD-270 711 repriced $2.00

Institute for Research in Vision, Ohio State U., Columbus.
EXPERIMENTAL EVALUATION OF OPTICAL ENHANCEMENT OF LITERAL VISUAL DISPLAYS, by H. Richard Blackwell, James G. Ohmart, and Robert W. Brainard. Rept. for 1 June 58-13 Dec 60, on Human Performance in Advanced Systems, Contract AF 33(616)5463. Oct 61, 79p. 4 refs. ASD Technical rept. 61-568.

DESCRIPTORS: *Optical filters, *Display systems, *Targets, *Target recognition, Luminescence, Probability, Visibility, *Visual perception, Visual acuity, *Space perception, *Aerial photography.

Visual displays of aerial views of terrain possessing both high resolution and a scale of luminances based upon a simple transformation of the luminances of ground objects (literal displays) were subjected to optical enhancement, and the target information extractable from them by human observers was determined. The visual displays were obtained by optical enhancement of photographic negatives of various areas in a terrain model. Two enhancement techniques were used: manipulation of photographic processing to alter luminance contrast values and optical spatial filtering to suppress or eliminate selected sizes of luminance discontinuities. Performance was measured in terms of probability of target detection under conditions of veiling light. When the probability of detection was low or moderate at a gamma of 1, increases in gamma were accompanied by increases in the probability of detection; when it was high at a gamma of 1, detection probability either remained unchanged or decreased slightly with increasing gamma. Of the optical filtering masks studied, some always reduced the probability of target detection, whereas the most effective increased this probability at the lower values of detection probability. (Author)

SOCIAL SCIENCES

Documentation

AD-271 600 $2.25

Armed Services Technical Information Agency, Arlington, Va.
LANGUAGE ORIENTED RETRIEVAL SYSTEMS, by Paul H. Klingbiel. Feb 62, 100p. 33 refs.

DESCRIPTORS: *Documentation, Automation, *Data processing systems, *Data storage systems, Information theory, Mathematics, *Language, Numerical methods and procedures, Subject headings, Catalogs, Bibliography, Preparation, Indexes.

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TID-5059(5th Rev.) $2.50

Atomic Energy Commission, Div. of Technical Information Extension, Oak Ridge, Tenn.
CORPORATE AUTHOR ENTRIES USED BY THE DIVISION OF TECHNICAL INFORMATION IN CATALOGING REPORTS, ed. by Everett J. Hoffman. 142p. 6 refs.

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